



The 38th Annual

Report to Minister of Transport



***Southern African
Transport Conference***

*"Disruptive Transport Technologies"
- Is South and southern Africa ready?*

8 - 11 July 2019

REPORT of the Proceedings of the SATC 2019

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BACKGROUND

The Southern African Transport Conference (SATC) originated in 1982. It arose from a need to transfer knowledge and build capacity within the transport sector. Its forerunner, the Annual Transport Research Conference, was organised by the National Institute for Transport and Road Research (NITRR) of the Council for Scientific and Industrial Research (CSIR). It was characterised by the delivery of papers that reveal the progress of transport research in South Africa.

Originally known as the Annual Transport Conference (ATC), the SATC has always had strong support from the Department of Transport, with the Minister of Transport being the Conference's honoured patron

A call to submit expression of interest begins at the previous SATC. The review process that follows ends up with the top papers being selected to feature at this prestigious conference. Essentially all subjects presented at the SATC are based on research papers that are strictly reviewed and selected by the Technical Committee during March.

SATC 2019 (8–11 July 2019)

The 38th Southern African Transport Conference (SATC 2019) was held at the CSIR's International Conference Centre (ICC) from 8 to 11 July 2019. Table 1 provides the general programme for the conference. A total of 123 papers were presented in 11 sessions and two workshops. It was attended by 550 delegates. The general feedback was that the conference was exceptionally valuable and provided good value for money.

These delegates included 109 young professionals, while 28 of the papers were written and presented by young professionals in the industry. International delegates came from Botswana, Canada, China, Mozambique, Nigeria and the USA.

Delegates received useful information that could assist them in their professional environments. The importance and value of stakeholder interaction was again highlighted. In particular, the public, private and international interaction and sharing of technical and experiential knowledge was of great value.

The theme of the conference was “Disruptive transport technologies – is South and southern Africa ready?” The various sessions covered topics related to the provision and support of transportation infrastructure, operations, management and safety to improve the quality of life in southern Africa.

For the 14th year, SATC sponsored winning students from tertiary institutions who participated in an essay competition addressing the theme of the conference. This year, three Chinese

students from Chang'an University attended. There was also a student from the University of Pretoria, a student from the University of Cape Town, two students from the University of Stellenbosch and three students from the University of Fort Hare. Each of the students had the opportunity to deliver a five-minute presentation on their essay recommendations. This was exceptionally well received by the delegates.

An exhibition, consisting of 17 stands, also formed part of the conference over the four days.

Table 1: General programme

Date	Session number	Event
Monday, 8 July		Opening session
	1A	Infrastructure
	1B	Treasury Workshop – Public transport and spatial transformation
	1C	Rural development/capacity building
	1D	Rail
Tuesday, 9 July	2A	Urban and public transport
	2B	Traffic management, safety and security
	2C	Freight and logistics
	2D	Aviation
Wednesday, 10 July	3A	Multi-modal transport
	3B	Traffic engineering
	3C	6 th China-Africa Transport Cooperation Forum with the Belt and Road Initiative (BRI) and APT Workshop
	3D	Maritime
Thursday, 11 July	4A	Implementation of integrated public transport networks
	4B	Empowerment opportunities in transport by Tshwane Women in Transport

Opening and plenary sessions

- Mr Philip Hendricks, ATC Board chairperson, officially opened the conference.
- Dr Gustav Rohde (Aurecon) delivered the plenary address on Monday, 8 July 2019.

According to the National Development Plan (NDP), by 2030, investments in the transport sector will ensure that it serves as a key driver in empowering South Africa and its people.

Enabling technologies such as location referencing, tracking and building information modelling (BIM) are radically changing transportation engineering. Public expectations of transport services continue to change. Public transport users have become connected, vocal and demanding.

Technology without user appreciation is ineffective and a change in competencies and skills is required. “We need humanists, as well as technologists, systems thinkers, storytellers and innovators to drive the future of transport technology in South Africa.”

- Prof Imad Al-Qadi (University of Illinois at Urbana Champaign, USA) delivered the plenary address on Tuesday, 9 July 2019.

The transportation sector made a 10% contribution to the country’s nominal gross domestic product (GDP) in the first quarter of 2019.

South Africa’s greenhouse gas (GHG) emissions, per capita, are almost double the worldwide average. South Africa’s per capita GHG emissions rate is 8.97, which is almost double the worldwide average. According to the World Bank, South Africa ranks 34th in the world in terms of its GHG emissions per capita.

The transport sector continues to play a large role in climate change. A year-on-year increase in carbon dioxide (CO₂) emissions over 25 years has taken place in South Africa and 71.3% of all oil-based emissions in the country stemmed from the transportation sector.

- Mr Victor Radebe (Autonomous Vehicles Africa) presented the plenary address on Wednesday, 10 July 2019.

South Africa must grow the next generation of data and artificial intelligence (AI) scientists in the transport sector and rewrite the rule book for future mobility. The three revolutions taking place in transport include ride sharing, connectivity and autonomy. South Africa, though, is still at a very low base in terms of the adoption of electric vehicles.

Trends to watch include 5G, which will make vehicle-to-vehicle communication possible, even at highway speeds, AI and drones. Mr Radebe believes that the future is all about the mobility-as-a-service ecosystem.

HIGHLIGHTS FROM SESSIONS AND WORKSHOPS

Infrastructure

Session 1A, Monday, 8 July 2019

Ten papers were presented in this session.

- James Maina, a professional pavement engineer and full-time professor of civil engineering at the University of Pretoria, delivered a presentation on an experimental study that looked at various factors that influence the mix design procedures in order to evaluate whether the extended Marshall mix design procedures can be reliably used to develop rut-resistant asphalt mixes. The Marshall mixes were compared with the superior performance asphalt pavements (Superpave) mix design procedure for its secondary compaction and plastic deformation potential. It was found that void at refusal density in the extended Marshall design procedure is not a reliable parameter in determining the plastic deformation potential of asphalt mixes. The general response from the audience was that the study highlighted practical and important aspects of mix design and a suggestion was made to look at the impact of changes in aggregate gradation.

- Matthew Townshend, a transport economist and PhD student at the University of Cape Town, presented a paper that interrogated the accuracy of the estimates of the road maintenance backlog in South Africa by examining the commonly cited amount of R197 billion, based on the estimated value of the Committee of Transport Officials (COTO) in 2014, and also cited in the 2018 Draft Roads Policy for South Africa. On the basis of the study, the modelling suggests that rehabilitation backlogs are potentially as high as R135.4 billion for the paved road network and R281.2 billion for the gravel road network, giving a total of R416.6 billion. The discussions that ensued were a clear indication that it was a thought-provoking paper, bringing to light the realities of the magnitude of these backlogs and implications for road investment policy and budget planning for the nation.
- Reinhardt Arp, an environmental economist with WWF South Africa's Policy and Futures Unit, delivered a paper that was intended to provide policy makers and decision makers with a roadmap for estimating and including externalities in their decision-making processes. It also illustrated the significant size of fossil fuel externalities. Road freight was found to generate GHG and air pollution externalities of approximately R10.42/t.km, while rail freight only generated an estimated R0.012/t.km for GHG- and air pollution-related externalities. Coal-based electricity was found to have an external cost of about R0.48/kWh in terms of GHG and air polluting impacts. A comparative analysis was done with the most recent global carbon prices required to achieve the 1.5 °C and 2 °C target temperature of the Paris Agreement. It was suggested that to achieve the 2 °C target, an economy-wide carbon price of R505.63/tCO₂e is required by 2020. The observation made was that the actual monetary values require more research and that the suggested value is simply a guideline.
- Wendy Collinson and fellow researchers were scheduled to deliver a paper titled: "Protecting the protected through assessing driver behaviour in Kruger National Park, South Africa". However, this paper was not presented.
- Frank Netterberg and Mike Pinard reported on long-term Kalahari sand-asphalt and local calcrete base course experiments with double surface treatment on the Kanye-Jwaneng Road in Botswana. The purpose of these experiments was to evaluate various alternative road base materials, where good-quality gravels are scarce. These experiments showed that it is not necessary to import gravel sub-base material as the well-compacted sand performed well and could even be considered as untreated base course for lightly trafficked roads in Botswana. It was interesting to note that, owing to construction and weathering effects, the performance of the cement, lime and mechanically stabilised calcretes in these experiments was inferior to that of their untreated equivalents.
- Phia Smit and Kearsley discussed the complex modelling of ultra-thin continuously reinforced concrete pavement (UTCRCF), which is an innovative pavement type that typically consists of a 50 mm high-strength steel fibre-reinforced concrete layer overlaying existing or new pavement structures. The reduced thickness and high modulus of elasticity of the concrete layer makes it necessary to compare the response of UTCRCF to both conventional thin asphalt and concrete pavements. Although critical parameters were not highly affected, the overall responses from the axle load models were significantly different from the single-wheel models.

The vertical and horizontal displacement in the substructure for the single-wheel and axle loading was also significantly different. It was concluded that the stress dependency of granular base and sub-base layers, as well as interlayer friction, needs further investigation using these more complex modelling techniques.

- Kidgell, Wynand Steyn and Jordaan reported on the effect of a nano-saline stabilising agent on dolomite (a so-called “problem” soil due to its susceptibility to weathering in the presence of water), particularly with regard to water-repellent and moisture sensitivity. The results described the influence of nano-modified emulsions (NME) as a stabilising agent on the plasticity index (PI), optimum moisture content (OMC) and maximum dry density (MDD) between the neat and stabilised dolomite material. The newly obtained knowledge from the normalised moisture/density relationship and index properties of these problem dolomitic soils treated with NMEs provided an indication towards the provision of a potentially more cost-effective road infrastructure.
- Andrew Laatz, Cocks and Burger reported on the re-use of local concrete found in older pavements, which should not be classified as building rubble spoil and is not desirable to be used in high-quality pavement layer works as some practitioners have suggested in the past. The use of reclaimed asphalt pavement (RAP) in high-quality recovered concrete materials does not generally improve the strengths at the lower compaction due to the lack of cohesion between asphalt particles and the remainder of the mix. The blended crushed concrete and RAP material were used for both unstabilised selected layer works and the cement-stabilised sub-base, which complies with accepted standards. However, blending RAP into the recovered concrete aggregates (spoil) proved to be useful by reducing the cost of and need for new aggregate. As demonstrated, the re-use of these materials should be encouraged.
- Dingaana Masango and Binda considered aspects of the provision and management of transport infrastructure projects in the long term and explored relationships needed between various critical stakeholders for large infrastructure projects to flourish. The purpose of this paper was to provide an overview of the role that transport projects can play in the transitioning and management of the provision of transport infrastructure. A stakeholder workshop was held to establish the current state of infrastructure provision and management with respect to transport infrastructure projects. The purpose was to get perceptions from experts on the issues and processes followed to plan for the long-term infrastructure provision and management, as well as to identify approaches that can facilitate more effective stakeholder relations. It was finally emphasised that it is critical that decision makers embark on clearly designed plans that outline the long-term management of projects that are able to provide a conducive and enabling environment for successfully rolling out transport infrastructure projects in the future.
- Zhao Hu, Xie and Lai argued in their paper that the existing demarcation regulations in China of deep and shallow tunnels are inappropriate due to macropores in a loess stratum for large-section shallow tunnels. The theoretical bases that distinguish between the depth of deep and shallow tunnels, as well as the characteristics of the common calculation methods of surrounding rock load on depth were analysed.

They studied tunnel design in loose (loess) material and claimed a new structural reference method that distinguished the threshold cover depth of deep and shallow tunnels by the coefficient of lateral pressure at the centre line. Their calculated results are consistent with the on-site findings, and concluded that the surrounding rock pressure in a deep tunnel is so-called “deformation pressure”, while the surrounding pressure in a shallow tunnel is defined as “loosening pressure”.

Treasury Workshop – Public transport and spatial transformation

Session 1B, Monday, 8 July 2019

This session was organised in partnership with National Treasury’s Cities Support Programme (CSP). On the basis that public transport viability is critically dependent on spatial transformation, the session invited contributions from practitioners to showcase how this can be practically achieved. The CSP presented interventionist priorities to support cities over the next three to five years. The focus will be on the following:

- Institutionalising Integrated Public Transport Network (IPTN) toolkits that were previously developed by the CSP
- Moving from planning to practical implementation
- Achieving modal integration and transit-oriented developments within the IPTN framework
- Strengthening partnerships with other state entities, specifically the national Department of Transport, the Department of Cooperative Governance and Traditional Affairs, the South African Cities Network and South African Local Government Association.

Lessons from implementing IPTNs in designated cities show that accelerated implementation requires some radical changes, including the removal of exorbitant financial pay-outs to affected minibus taxi operators. The concept of integration must also be clarified to enable its systematic monitoring. The participation of the private sector in the spatial transformation agenda, while currently very low, is seen as critical.

Uber delivered a presentation showcasing how transactional data from Uber users can be used to inform transport planning. The anonymous transactional data is provided free of charge to cities. Examples were given to illustrate the complexity of how passengers make use of space. This challenges simplistic planning approaches, which result in public transport services that are unable to respond to travel patterns. While the data was seen as useful, the relatively small sample size of the Uber service was seen as a limitation. However, indications are that, in future, the generation of some aspects of municipal transport plans can be automated.

Steven Friedman provided a political perspective on how spatial transformation in support of public transport could be achieved. Critically important was ensuring that a strong conversation is initiated with landowners to guide the creation of spaces that are supportive of liveable cities. The densification of land use should not be done in a manner that creates poverty traps. Therefore, the involvement of citizens in the shaping of spaces is fundamentally important.

The Gauteng City Region Observatory (GCRO) shared observations from its Quality of Life Survey on how the use of space is changing and its implication for public transport service delivery. The following issues were noted:

- Gauteng is displaying the most rapid growth in terms of population and urban development, with strong spatial implications on residential growth.
- The general trend of long trips to work and to look for work remain entrenched.
- Cars and taxis are the dominant modes of transport.
- Satisfaction differs significantly by mode, with the lowest satisfaction reported with rail transport.
- Pockets of improvement in public transport are evident.
- The prominence of taxis and cars, particularly in areas of growth, indicates poor public transport development to meet growing needs.

The South African Local Government Association presented its position on how capacity in local government should be enhanced to fast-track the implementation of the spatial transformation agenda. The five-year political cycle is insufficient to create traction on spatial transformation unless continuity is maintained. The “not-in-my-backyard” attitude is a strong impediment to implementation. Platforms where municipalities can have shared experiences are desperately needed. Public investment must also be structured in a manner that will attract private sector investment. Workflows across municipal programmes and structures must be integrated in support of spatial transformation.

Rural development/capacity building

Session 1C, Monday, 8 July 2019

Three overarching presentations provided the context around which issues of capacity building, transportation and development in general are perceived and discussed: regional integration and trade, spatial transformation and focused, place-based, socio-economic interventions.

- The first presentation dealt with the establishment of the African Continental Free Trade Area (AfCFTA) – the largest free trade area in the world in terms of participating countries since the formation of the World Trade Organisation in 1995. With its ratification, the dream of a free trade area for Africa is increasingly becoming a reality as it will house in excess of 1.3 billion people under one bloc with a combined GDP of more than \$2 trillion where local products will be traded between countries at minimal tariffs. It is indeed a clear statement and unambiguous message for the entire world, punting international cooperation at a time when the main global players seem to be embracing mercantilism and unilateral approaches, which often cause unnecessary tension that extends to vulnerable developing economies, such as South Africa, with deleterious socio-economic consequences.

The main elements that make this significant game changer on the continent work were spelled out, unpacking what it is, its magnitude, what it means to integration, which markets are buzzing, what it means for the private and public sectors alike, what the likely success factors for involvement could be and what the risks entail.

This presentation and the discussion that followed provided significant food for thought, particularly against the backdrop of the the President of South Africa's commitment to multilateralism and the development and integration of the African continent, as contained in his State of the Nation Address of 2019 (SONA 2019).

Clearly, it is important for Africa – and South Africa in particular (in this case, the Department of Transport) – to develop research programmes and conduct research that supports the African integration process. Examples are the following:

- Research around removing tariff and non-tariff barriers to trade on goods and services
- Research around improving and integrating infrastructure within and across countries and regions, e.g. one-stop border posts, transportation, communication and energy infrastructure
- Research around reducing the high transport and logistics cost barriers, and production constraints that affect trade in the region and across the continent
- Research around a more equitable spatial and industrial development paradigm, for example, concentrating development around corridors and nodes, including border posts
- Research around strengthening governance infrastructure to facilitate productivity and increased trade as well, and to reduce corruption
- Research around how to create conditions to diversify exports away from the current unstable commodities
- Research around increasing intra-African investment, the protection of property rights and eliminating unfair competition practices
- Research around getting, firstly, South Africa's transport industry, and by extension, the regional economic community transport industry, ready to take advantage of the opportunities that AfCFTA presents. This could be extended to other industries as well.

The presentation furthermore highlighted that the need to build a capable, developmental state through sustained capacity building and training programmes within South Africa and, by extension, across the Southern African Development Community (SADC) and other regions, cannot be over-emphasised.

The session revealed that there appears to be a strong belief and optimism that AfCFTA could transform Africa's economy, making it globally competitive and unlocking the potential that is often spoken about to create shared prosperity across the continent in a uniquely African way if all are involved.

The second presentation revolved around the need for spatial transformation with specific reference to rural areas and the pivotal role of transport in this transition. The presentation reminded delegates that South Africa has as yet to transform the spatial form from apartheid plans to a post-apartheid, integrated and inclusive future. Formal planning appears to be engaged in a desperate gambit of catch up with an inclusive people-oriented development paradigm, which is linked inextricably to land and development, naturally leading to informality in settlements and unsustainable economic activity.

In the same vein, development is largely being led by market forces that often determine where development takes place – be it for resource extraction, for human settlements or for commercial purposes – all without the state playing a decisive role in spatial and economic transformation. In addition, there can be no doubt that the symbiotic relationship between spatial planning and transportation, while acknowledged, is hardly a decisive factor in implementation decision regimes, and yet it needs to occupy centre stage in the country's development narratives and practice.

For example, in agriculture, intra-African agricultural trade is particularly underexploited owing to high import tariffs, other non-tariff barriers (such as health and safety standards), low productivity, and a lack of rural connectivity. The presentation (and the discussion that followed) persuasively argued for the need and value of proactively developing consolidated rural service towns that are bequeathed with sufficient wherewithal to act as anchors and foci for equitable social service delivery, as well as promoting sustainable rural and regional development. These consolidated rural service towns would then be linked to rural-urban-regional corridors, improving productivity, as well as deepening integration of the rural and mainstream economies. Clearly, the vision of AfCFTA can easily be supported and lived by streamlined strategic local interventions that seek to establish and strengthen markets in rural service towns that are ultimately linked to export markets.

- The third presentation revolved around the Durban Aerotropolis. Airports are no longer considered merely glorified aviation terminals, often graced with fancy architecture. They are now increasingly undergoing planning processes that establish them as nodes and integrate them seamlessly with the surrounding socio-economic ecosystem with a view to transforming them into dynamic regional growth engines, which are capable of anchoring and driving urban form, economic activity and competitiveness. The Durban Aerotropolis concept was unpacked, highlighting the capacity building requirements across the board to ensure its realisation.

One of the anchors of SONA 2019 related to the development of productive, post-apartheid smart cities that are connected by high-quality public transportation. As a discussion point, the point was made that the King Shaka International Airport, together with the adjacent Dube Trade Port, were constructed in the post-apartheid era and could therefore, together, be legitimately considered as a post-apartheid urban node. So, instead of letting the private sector dictate the nature and intensity of development in this prospective town, national government should take a much more proactive role through structured and spatially intelligent investment in socio-economic infrastructure, such as human settlements, energy, transportation and communication. While KwaZulu-Natal and its metropolitan municipality are currently investigating public transport solutions that seamlessly connect the node to the rest of the province, its ambition may be limited to what it can indeed afford.

This needs to be perceived as an opportunity – an inflection point for national government where this vision of post-apartheid smart cities could be incubated. The idea could be conceived as a special demonstration project – an urban living laboratory – the results of which could be transferred to completely independent future cities.

Elements of the Fourth Industrial Revolution (4IR) could be tested and refined. In this regard, for example, the Department of Transport ought to be involved in the quest to find a smart mobility solution that connects the node to the rest of the province by heightening the ambition of the current provincial probe into this matter.

- The remainder of the presentations revolved around unpacking tools and interventions designed to improve transportation service delivery outcomes. These included the following:
 - The use of correspondence analysis and logistic regression to estimate demand for integrated public transport networks
 - The integration of information and communication technologies (ICTs) for improved road traffic movement in Mthatha
 - Establishing the readiness of the municipal regulatory entity – a process that is undertaken to develop an operating licensing administration system and transactional platform
 - Estimating marginal social costs, issues and suggestions using Namibian roads as a case study.

Lastly, it was clear that the session presentations and the discussions that ensued unravelled some big-ticket issues that the Department of Transport can and should indeed take forward in its work.

Rail

Session 1D, Monday 8 July 2019

The rail session focused on three critical aspects related to the South African rail industry.

- The first part of the session discussed the current state of and future plans for rail freight and passenger networks in South Africa. This session was opened with a presentation on the principal factors that contribute to the efficiencies and economic sustainability of integrated railway systems in the country. An important aspect that was highlighted was the need to also interview rail customers to obtain their input on what needs to be done to improve rail transport efficiency. This was followed by a presentation on the factors that contribute to rail freight losing market share. The learnings from these two presentations provided decision makers with the necessary background and insight to effect a turnaround with regard to rail efficiency, economic sustainability and the much-needed growth in the freight market. The first part of the session was concluded with a presentation on the future plans for the integrated Gauteng Rapid Rail network. The speaker emphasised the employment crisis in the country and the need to create employment through public transportation projects. The need for more public transport in Gauteng in the future was pointed out by studying future projections of traffic congestion between Pretoria and Johannesburg.
- The second part of the rail session was more technical, starting with an economic analysis of the benefits of changing the Gauteng-to-Durban railway corridor from narrow to standard gauge. It was shown how this route could benefit from a gauge conversion, in line with the recommendations outlined in the National Rail Policy.

Double-stacking containers would be transported on this line and would be financially viable, given the projected tonnages for this corridor. The second presentation described the use of satellite radar imagery to assist with the upgrading and maintenance of existing railway lines with specific reference to short- and long-term stability.

- The last part of the rail session highlighted the very important aspect of rail safety. The first presentation proposed solutions to address the informal pedestrian crossing of railway lines in the Cape Town, while the second comprised a case study of a major level crossing collisions in the same province. The use of advanced technologies and driver assistance through AI and optical recognition certainly has potential in the future. The conclusions and recommendations from these two studies can make a significant contribution towards rail safety in South Africa.

Urban and public transport

Session 2A, Tuesday, 9 July 2019

The papers presented in this session covered a wide range of topics, which ranged from stakeholder engagement in various forms to technology disruption, minibus-taxi service improvement, bus passenger satisfaction measurement and transport funding. The contexts of the papers covered Cape Town, Tshwane and the Gauteng City Region, as well as a broader sub-Saharan African focus. Four of the 10 papers focused on aspects of minibus-taxi service improvement. Two papers related directly to the conference theme of technology disruption, exploring impacts on public financing and service operations. These papers highlighted the importance of anticipating technology change, and harnessing this for service improvement across all modes.

Traffic management, safety and security

Session 2B, Tuesday, 9 July 2019

Ten presentations formed part of this session.

- The first presentation, delivered by Marcel Schroder and Britten, focused on speed management in transition zones between high-speed rural and low-speed urban zones. The following recommendations were made:
 - Road authorities need to take note of the case study that found that the transition zones are not visible and that drivers end up within the urban area travelling at speeds higher than those recommended, creating dangerous situations.
 - Road authorities need to take note of the measures that were proposed to be implemented within the transition zones to reduce speed from the high-speed rural areas to the low-speed urban areas.
 - There should be healthier communication between road engineers and law enforcement within authorities towards the identification and mitigation of road safety issues.
 - When designing footpaths next to roads, pedestrian restraint systems need to be included to protect pedestrians from vehicles.

Several questions arose from this presentation. These included the following:

- Speed is a challenge as drivers do not realise that they are entering an urban area. What is the link between engineering measures and the role that law enforcement should play?
 - Although the road authorities participated, the consulting engineers petitioned the authority to assist with law enforcement. Only one patrol officer was available to assist with law enforcement, highlighting the lack of human resources in local authorities.
 - What is the background to the study (in terms of crash statistics) in terms of the challenges that preceded the engineering interventions?
 - The author referred the delegates to the second paper that would be presented in the engineering session on 10 July 2019.
 - The presenter indicated that engineers cannot design for driver behaviour.
 - The session chair questioned the design of the walkways as there were no restraints to protect pedestrians walking on the sidewalk.
- The second presentation, delivered by Malefo Mabe and Chauke focused on the acceptance of non-motorised transport users' safety measures in built-up areas: a case study on the roads of SANRAL. The following recommendations were made:
 - Based on the case studies discussed, it was concluded that not all users of non-motorised transport (NMT) use the constructed/allocated infrastructure along national roads. There is a need to continuously engage local stakeholders through road safety education and awareness campaigns to promote the use of NMT facilities along the national roads.
 - The existing legislation and policy may have to be revised, or new legislation or policy developed to govern design elements that could affect the implementation of traffic-calming measures in more built-up areas. For example, SANRAL has developed guidelines for pedestrian and public transport facilities on national roads. This shows a paradigm shift by SANRAL in accepting that there is a need to have a balance between mobility and accessibility.
 - According to research conducted by Sinclair in 2017, insufficient attention is paid to the integration of the road function with decisions about speed limits, road layout and design. Detailed discussions are needed to focus on revising design elements that influence road safety.
 - It is evident that SANRAL, as the road authority for national roads, should provide for NMT infrastructure on all national roads traversing villages and townships.
 - As confirmed in research conducted by Macozoma and Ribbens in 2004, the provision of NMT facilities should be proactive, and the provision of these facilities should adequately meet the needs and safety of the most vulnerable road users.
 - Based on the case studies, it is evident that, in general, communities and road users residing in villages and townships adjacent to national roads are accepting the NMT infrastructure and the interventions provided.
 - Community involvement is key in achieving the implementation of NMT infrastructure interventions and their acceptance.

- Concerns were raised about incidents such as crime at pedestrian bridges and underpasses. It was noted that no such incidents were recorded at the infrastructure that were provided. This is, however, a serious concern in South Africa.
- Concerns were raised that the Hammanskraal pedestrian bridge is not used by pedestrians. It was noted that protests in the area deterred pedestrians from using the bridge.
- The question was raised as to which community stakeholders are included in stakeholder engagements during the design phase. It appears as if not all stakeholders are included. If a community consultation approach is followed, it needs to engage the community from start to end. After identifying appropriate measures for implementation, in consultation with the community, there is a need for a continuing education programme that educates the community regarding the construction and correct use of the new facilities.
- Concerns were noted that constructing pedestrian bridges and underpasses where national roads meander through villages and townships might not be a pragmatic solution as they hamper free pedestrian movement between such villages and townships, and that pedestrians will still cross the road at a place that provides them with the shortest route to their destination.

Several questions arose from this presentation. The presenter gave an overview of the solutions implemented, which included the following:

- What is the utilisation rate of the bridges?
 - What impact are the bridges making in terms of curbing crashes?
 - The authority built the wall to encourage the use of the overhead bridges. However, it is the community that damages and vandalises the structures. Are these structures in the correct place? If they are, why is the community damaging structures to make access routes at specific locations?
 - There is a need to consult with all community leaders and role-players before implementing these costly solutions.
 - The focus is on national routes, but there is a need to look at rural roads as well.
- The third presentation, delivered by Mariaan van der Schuren and Deon Roux focused on a road safety comparison in South Africa: how do the different provinces compare to each other? The following recommendations were made:
 - The success of different provinces in South Africa to reduce fatalities varies .
 - Provinces need to create a road safety strategy that has a significantly higher success rate. Data mining, as demonstrated in this presentation, is required.
 - Focused strategic road safety programmes need to be implemented in the respective provinces, which are specific to the needs of the respective provinces, to reduce road-related injuries and fatalities. These needs are identified through data mining to identify province-specific road safety challenges.
 - The limitations and challenges related to road traffic data for South Africa can be eliminated by implementing the following initiatives: not only recording fatal crash data, but data of the whole spectrum of road crashes; addressing the completeness of data, such as age and the location of crashes, among others; and recording million vehicle kilometres travelled for all road authorities, and using this to normalise the data.

- Concern was raised about the reliability of road crash data.

Several questions arose from this presentation. These included the following:

- The presentation provided an overview of the statistics, but where is South Africa in terms of progress made with the United Nations Office for Disarmament Affairs? The presentation needs to reflect on where we are and how much progress has been made.
- The Chair asked whether supplementary research from universities was considered.
- The fourth presentation, delivered by Louis Roodt and presented by Kobus Labuschagne, focused on revisiting the status quo of road safety audits in South Africa in 2019. The following recommendations were made:
 - The Road Safety Auditor (RSA), presented by the South African Road Federation (SARF) since 2015, has reached many road safety professionals.
 - The fact that 20 of the road safety auditors that attended the SARF/RSA course are from other SADC countries indicates progress in the recognition of road safety in a regional context.
 - Trained auditors are satisfied overall with the training and the course material presented.
 - Aspects that need attention include the fact that the auditing process is followed, but certain steps are sometimes omitted, i.e. lack of commencement and completion meetings and feedback, and recommendations that are not always implemented. In addition, design engineers do not always provide sufficient information for the audits to be performed.
 - The status quo of road safety audits in South Africa in 2019 seems to be healthy and improving as the skills set develops and commitments by road authorities become institutionalised. It is, however, reason for concern that the field is dominated by a few players.

Several questions arose from this presentation. These included the following:

- What are the criteria for a specialist road safety auditor?
- What is the impact of road safety audits?
- The fifth presentation, delivered by Taariq Dollie and Marion Sinclair focused on the use of hard shoulders as a turning lane: a safety evaluation. The following recommendations were made:
 - The primary concern arising from the study is the high number of conflicts counted between vehicles in turning lanes and vulnerable road users.
 - The bulk of these conflicts involved minibus taxis and buses, but normal passenger vehicles are involved as well.
 - In all cases, the conflicts would have been avoided had pedestrians been protected on sidewalks, and had cyclists been separated from the traffic in a more formal manner.
 - The presence of a protected sideways space – and separated space for cyclists – is possibly the most important element in this case.

- Most of the conflicts of concern in this study related to vehicle conflicts with these road users. The protection of non-motorised users therefore becomes even more critical.
- Lateral clearance between cyclists and other vehicles means that the widths of hard shoulders should also be considered.
- Given that the behaviour investigated here is most likely the tip of a growing iceberg, it seems prudent for traffic engineers to seriously consider the implications of hard shoulders running in advance of traffic signals, with an eye to protecting the safety of all road users.
- At the moment, this behaviour is still fairly new, and it would appear that – the measured conflicts notwithstanding – many motorists proceed along the hard shoulder with a fair amount of caution.
- That could well change as hard shoulder running at intersections becomes viewed as “normal” driving behaviour, and the drivers develop an enhanced sense of entitlement to proceed at all costs.
- The conclusions of this case study need to be brought to the attention of design engineers at road authorities.

Several questions arose from this presentation. These included the following:

- You described the problem, but what are your recommendations to address this behaviour?
 - This topic might warrant additional (wider application) research.
- The sixth presentation, delivered by Basil Jonsson, focused on prioritising and mitigating road safety at schools in Mogale City, South Africa. The following recommendations and observations were made:
 - The Botnar Foundation in Switzerland identified six countries with the highest road safety risks for children. These countries are India, Mexico, Rumania, South Africa, Tunisia and Vietnam.
 - The Global Road Safety Partnership in Geneva will manage and administer the projects in the six countries.
 - A formal bid process was followed. From the 57 submissions that were submitted, 12 projects were chosen. The South African Road Federation was appointed as the lead organisation, together with Mogale City and 3M South Africa. It is the only project in South Africa to receive funding for its road safety submission.
 - The South African Road Federation has performed a composite road safety risk analysis. This included the use of the International Road Assessment Programme (iRAP) star rating for schools at the 89 schools in the Mogale City precinct. It identified the 10 schools in Mogale City with the highest road safety risk to learners.
 - The South African Road Federation will commence with the road engineering infrastructure upgrades around the schools, while 3M South Africa, together with the Mogale City Traffic Department, will present a road safety education programme at these 10 schools.
 - The South African Road Federation will conduct a mobility survey, as well as a knowledge, attitude and practices (KAP) survey before and after the infrastructure upgrade at the 10 schools.

- The South African Road Federation needs to document whether the infrastructure upgrades, together with the road safety education programme at the schools, made it safer for the learners to attend school.
- The main project objective was the transfer of knowledge by evaluating the impact of measures implemented on the road safety of children at schools and to document the implementation methodology to enable the replication of the model in other South African cities.
- The work of the South African Road Federation and Mogale City needs to be commended and should set the tone as to what needs to be executed at all schools in South Africa, especially at schools in rural areas.

Several questions arose from this presentation. These included the following:

- Is there anything in place to regulate and address taxi driver behaviour?
 - There is a need to look at remuneration models to address behaviour.
- The seventh presentation, delivered by Karien Venter, Muronga, Sallie, De Franca, Kemp, Botha, De Saxe, Berman, Binda, de Beer and Sinclair focused on naturalistic driving studies in support of road safety research in South Africa. The following recommendations and observations were made:
 - The current local initiatives focus on driver behaviour aspects, but naturalistic driving studies (NDS) have a much wider field of application, where the knowledge gained should inform the design of different engineering and education remedial measures that are aimed to achieve ultimate safety.
 - Apart from the fact that, with NDS research, South Africa will be able to contribute to a global road safety knowledge pool from a developing middle-income perspective, naturalistic driving studies have the potential to contribute to an in-depth understanding of road user behaviour within the South African context, which leads to near misses, serious incidents and ultimately fatal crashes. Recent work on automating elements of the NDS data-processing task has shown how the labour costs associated with such studies can be reduced in future.
 - This has the potential to make NDS more viable in future, when compared to self-reported or simulator-based studies.
 - This work needs to be commended as it contributes towards understanding and mitigating the estimated 91% human behaviour contribution in crashes.
 - Further research on human factors needs to be commissioned in South Africa to reach the goals set in the National Road Safety Strategy 2016–2030.
 - The eighth presentation, delivered by Phindile Binda and Muronga, focused on distracted driver behaviour in South African townships: a roadside observation study. The following recommendations and observations were made: Further research should be conducted with regard to distracted driver behaviour in South Africa to understand and establish the risk of each distraction.
 - Further research on the same attributes should be conducted over a longer period of time, covering all the travel times of day and more days of the week.
 - Further research should be done in other locations types, such as on higher-speed roads, rural areas, near schools, etc.

- More data is needed and, with more information emanating from such research, authorities will be able to identify alternative solutions towards improving the behaviour of drivers and subsequently improve safety on South African roads.
- The ninth presentation, delivered by Karien Venter, Sinclair and Lennox focused on novice driver training within the South African National Road Safety Strategy 2016–2030. The following recommendations and observations were made:
 - Previous calls have been made to introduce a hazard perception test before and during learner driver training. This research supports this call as the current K53 training regime makes little provision for novice drivers to develop these important skills as part of their training.
 - The rate at which motorised traffic is growing, and at which new drivers are admitted to the road and traffic system, have serious implications for the number of traffic deaths in the country.
 - Learning to drive is a complex task that, in addition to ensuring that the vehicle is kept on the road, requires novice drivers to anticipate and appropriately react to events in the road and traffic environment.
 - Driver training and education need to ensure that newly licensed novice drivers who prepare to exit the learning environment and enter the road network are competent, and situationally aware of the driving environment when they start to drive solo.
 - The conclusion is that the K53 driving test does not currently specifically support the training of safe drivers, but rather the training of learners to successfully pass their driving test.
 - Unfortunately, this means that – as a country – we are not necessarily facilitating the entry of safe novice drivers to the road network.
 - This study’s results therefore motivate the urgent need to re-evaluate the current training and testing practices of new novice drivers in the country.
- The tenth presentation, by Thinandavha Munwana, focused on the challenge of drunk driving enforcement: a study in Vhembe District. The following recommendations and observations were made:
 - A comprehensive, systemic approach is necessary to successfully identify, prosecute, sentence, supervise and – ultimately – rehabilitate persistent drunk driving offenders.
 - Many offenders are habitual, and sometimes need professional assistance.
 - The results revealed that there is a high number of nil prosecutions due to a variety of reasons.
 - In most cases, dockets are struck off the roll due to the poor quality of statements and investigation made by investigating officers.
 - Other contributing factors are a lack of resources and delays in the results of blood taken from the suspects that lead the presiding officers to abandon the cases.
 - In some instances, registered nurses or doctors are not available within two hours of the initial arrest of the suspect, resulting in the case not being able to be prosecuted.
 - Police officers are also a factor in the decline of prosecution as most of them fail to follow the basic principles of reading suspects their rights, completing dockets and taking relevant statements for the case.

- It is recommended that investigating officers receive proper training, The provision of resources should increase the number of drunk driving cases prosecuted.

Freight and logistics

Session 2C, Tuesday, 9 July 2019

This session covered a range of topics on heavy vehicle technology, and freight transportation and logistics in southern Africa and, to some extent, Africa as a continent.

A number of papers focused on technical aspects of heavy vehicles. Two papers addressed various aspects of heavy vehicle tyre testing: Rob Berman discussed the CSIR's tyre-testing and stress-in-motion facilities for determining selected tyre parameters, while Christopher de Saxe discussed a camera-based tyre side slip measurement system. Anton Steenkamp and co-workers considered the effect of road pavement crossfall on road wear caused by heavy vehicles. The impact of high capacity vehicles (HCVs) was addressed by Lana Kemp and co-workers at the CSIR, in particular benchmarking the safety performance of HCVs participating in the performance-based standards (PBS) pilot project in South Africa against standard heavy vehicles. The final presentation, also by Christopher de Saxe, addressed the technical aspects of heavy vehicles, focusing on defining a PBS framework for HCVs in Europe.

On the logistics side, Peta Thomas and co-workers from the University of Johannesburg evaluated the impact of costing and marketing on road freight competition. A paper presented by Lemo Monyatsi explored the need for a coordinated transportation plan as an enabler for intra-African trade and economic development. He also explored some challenges and constraints that must be overcome for a feasible coordinated transport plan. Finally, Wilna Bean used an urban transport simulation to investigate the impact of after-hour deliveries in the City of Cape Town on carrier and receiver cost and carrier fleet composition in the area. Results indicate that after-hour deliveries in urban areas could potentially lead to significant cost savings for private sector logistics stakeholders.

Aviation

Session 2D, Tuesday, 9 July 2019

This session was chaired by Major Nandi Zama, an esteemed military pilot in the South African National Defence Force (SANDF), who is recognised as the first black woman in the history of South Africa to fly and command a Hercules C-130 cargo plane.

In keeping with the theme of the conference, the session began with two presentations on aviation in the 4IR that drew significant interest from delegates. Hildegard Koen opened the session with an introduction to AI and Big Data. This was able to dispel the mystery around these two buzzwords. This introductory talk laid the foundation for further discussion on 4IR applications for aviation. The second presentation, delivered by Dorothy McCormick and Adrian Roos, focused on how real-time Big Data could be used for commercial aviation operations. Employees of Air Traffic Navigation Services (ATNS), including the Head of Air Traffic Management Research, were in the audience to evaluate the application of this topic in their environments.

These presentations were followed by a panel discussion on the safe integration of remotely piloted aerial systems (RPAS) into civil airspace. The topic of RPAS integration was very relevant to the conference theme with many opportunities to discuss the development of technology, operations and policy.

The panel discussion was chaired by Aarti Panday, an aeronautical engineer.

The panel comprised Chris Burger, Uvesh Gopichund, Patrick Ndhlovu, Sam Twala and Dale McErlean

The SACAA was invited to participate in the panel discussion, but was unable to attend due to pressing commitments. Each speaker spent approximately 20 minutes giving their perspectives on the safe integration of RPAS into civil airspace. Burger described the opportunity and the challenges associated with RPAS integration, while Gopichund gave the ATNS's perspective on how current airspace management enables safe integration and how this could be enhanced in the future.

Ndhlovu, Twala and McErlean were able to give strong industry perspectives on how the airspace could be further exploited for economic development and job creation. This conversation no doubt needs further discussion, strategising, planning and execution of critical actions. The South African RPAS Industry Forum (SARIF), led by the SACAA, is one such platform that will enable progress in this area.

After lunch, Shepherd Dhlwayo presented an interesting study on success factors of low-cost airlines. This was followed by a presentation by the International Air Transport Association on a new standard for transporting live animals. It is important that the conference draws more participation and contributions in this area in future years.

The session was concluded with two fascinating presentations on technology disruptors in the aviation space.

Francois Maasdrorp presented the technology of passive radar, which presents an opportunity for South Africa and the ATNS to pioneer the adoption of a new disruptive technology. This also creates the opportunity for jobs and economic development. The advantage of South Africa's position is that it is at the forefront of this particular technology (at the CSIR) and manages a significant portion of the world's air traffic through the ATNS. South Africa is ideally positioned to pioneer, advance, mature and industrialise the technology to the benefit of the country's most pressing challenges.

Aziem Rujub presented opportunities for additive manufacturing. This is yet another relevant topic that will no doubt be a permanent feature of aerospace going forward. This is already a topic of significant investment by the Department of Science and Technology.

Multi-modal transport

Session 3A, Wednesday, 10 July 2019

Not received

Traffic engineering

Session 3B, Wednesday, 10 July 2019

A number of interesting papers were presented in this session. The management approach to optimise the performance of South African freeways was discussed with reference to various options, such as capacity improvements for all modes of transport. The need for improved incident detection procedures was highlighted to ensure that response vehicles could be dispatched timeously to attend to accident scenes.

Another paper by long-serving municipal engineers focused on transportation modelling in eThekweni and the resulting traffic projections over five decades. It was illustrated that transportation professionals often develop computerised transportation models, but do not necessarily consider their success or failure, especially over such a long period. The need to develop and maintain these transportation models was emphasised as it provides valuable input to transportation planning processes in the country's local authorities, especially the medium to larger authorities.

The ranking of road projects is an optimum way to ensure that public funds are spent wisely. This was discussed based on a case study in Namibia. Although the proposed methodology might be applied in some specific situations, it was indicated that a number of assumptions render the approach more applicable to high-level, first-order evaluations.

The public transport capacity elements of Integrated Rapid Public Transport Network (IRPTN) stations were evaluated from a traffic engineering point of view. It was indicated that detailed analyses of IRPTN station operations need to receive further research attention.

Another paper addressed the relevant payment technologies, and emphasised the need for convenience and simplicity to enable seamless operations for the public transport user.

A number of papers focused on road safety aspects, such as speed control by the introduction of illusion lines. The session was concluded by a presentation on an interesting investigation of the skid analysis of vehicles, based on tests performed on gravel roads in KwaZulu-Natal.

6th China-Africa Cooperation Forum

Session 3C, Wednesday 10 July 2019

Two VIP delegates from Beijing, China, were invited to present at this session. They introduced the background of the annual World Transport Convention (WTC), the Belt and Road International Transport Alliance and the China Highway and Transport Society, which run the WTC. They also provided information on annual transport development statistics, among other things. Two students from the Chinese Changán University performed the interpretation of the presentations of these two Chinese delegates into English.

Due to a delay in obtaining visas and for health reasons, a number of Chinese presenters could not attend this session. Alex Visser and Gerrit Jordaan, who delivered the presentations of these presenters in their absence, are thanked in this regard.

Chinese delegates visited the University of Pretoria's Engineering 4.0 Laboratories, the CSIR's accelerated pavement testing site and the Chinese embassy. These expanded the SATC's functions to support cooperation between South Africa and China.

The following suggestions were made:

- To continue to work with the China Highway and Transport Society and the WTC for its 2020 events: the annual SATC in South Africa and the annual WTC in China. The latter will be held in May 2020. All related matters will be arranged beforehand
- To continue to cooperate for this session with the annual Science, Engineering, Technology, Mathematics and Innovation (SETMI) Conference, which is hosted by the Science, Engineering and Technology and Education Association of Southern Africa and China, together with the South African Academy of Engineering (SAAE), the University of Pretoria and its Chinese counterpart, Changán University. The SAAE and its Chinese counterpart, the Chinese Academy of Engineering, signed an agreement for supporting the annual SETMI Conference.
- To explore the possible cooperation between the SATC (July 2020) and the WTC (May 2020) regarding mutual exhibitions in Pretoria and Beijing. The South African Minister of Transport has been invited to attend the WTC 2020.
- To consider a proper room for the session, with simultaneous interpreting equipment for the attendees.

Maritime

Session 3D, Wednesday, 10 July 2019

The experience of SATC's first maritime session was generally satisfying. The following presentations were made:

- Keynote speech: "Could a deep offshore port be a plausible futuristic green port development solution for South Africa?" (Nozipho Mdawe, Transnet National Ports Authority)
- "A port disrupted: the future role of ports" (Lwandile Mabuza)
- "The potential of cabotage for ports" (Simone Smith-Godfrey)
- "Bio-invasion and onshore ballast water management: a viable solution for developing economies" (Lawrence Kuroshi, presented by Kana Mutombo)
- "Cope levels in modern ports: a case study for the port of Ngqura" (TauqerAhmed and Kana Mutombo)
- "The potential of elephant grass (*Pennisetum purpureum schum*), a Nigerian indigenous grass, in bioethanol production: a decarbonisation alternative for the transport industry" (Marcel Azeke, Eze,Ubong, and Kuroshi , presented by Kana Mutombo)
- "Transnet Maritime School of Excellence service offerings" (Thabile Maphumulo)
- "Towards secure maritime transport in South Africa: an investigation of cybersecurity readiness of organisations" (Khangwelo Muronga, Letebele, Binda and Smith)
- "Impact of the Fourth Industrial Revolution in Africa for better ports performance" (Thamsanqa Basi)

- “Operation Phakisa” (Ricky Bhikraj)

Unfortunately, due to unforeseen pressing commitments with the Board of Transnet, Nozipho Mdawe could not attend the session to present her keynote address. Kana Mutombo presented a brief summary of her keynote address on her behalf.

Overall, Transnet’s offshore project concept attracted a lot of interest from the audience, as did the presentations on the Fourth Industrial Revolution and Operation Phakisa.

In recent times, the maritime sector has largely been classed as the “blue economy”, with greater catalytic effects. Against this view, there was a sense of tacit expectations from the audience towards seeking economic opportunities from the various presentations rather than focusing on scientific knowledge sharing. Meanwhile, the presentations and topics were mainly selected based on their respective scientific contributions in line with the defined conference theme.

Most of the presentations were, in fact, highly technical and/or summaries of PhD theses that did not necessarily meet the audience’s expectations. It might therefore be important that SATC considers clearly redefining the objectives that the conference seeks to achieve (presenting economic opportunities as opposed to scientific contributions), and then proceed to properly target its desired audience.

In general, there was growing concern from the audience on the country’s preparedness and readiness to embrace disruptive technologies in the transport sector. There appeared to be an increasing consensus from the audience that South Africa and the entire African continent are not ready for disruptive technologies, but tend to replicate initiatives from developed countries without assessing the region’s needs. A call for South Africa and Africa to seek adequate solutions for African problems was clearly made and needs further consideration.

Integrated public transport networks

Session 4A, Thursday, 11 July 2019

This session was designed to provide a platform for cities implementing IPTNs to provide feedback on their implantation programmes. The session also provided a platform for critical stakeholders to provide specialised inputs into how IPTN implementation can be improved.

A presentation on the proposed National Land Transport Act Amendment Bill highlighted notable information for IPTNs, including changes to the definition of an IPTN. Discomfort was expressed in relation to the following aspects:

- The amendment of section 12 of the Act to provide for the establishment of a provincial entity to take over certain provincial and municipal functions related to IPTNs
- The ineffectiveness of the Intermodal Planning Committees.

The possible relief for some municipalities to reduce planning obligations was generally welcomed. The possible consolidation of resources and skills by the planning authorities in a province in order to fulfil their obligations on IPTNs was also welcomed.

Busmark, a bus manufacturer, delivered a presentation from the perspective of a manufacturer on what cities should take into account when procuring buses in order to get value for money and maximise innovation. In future, buses could be used as sensors to collect transport planning data. The lifecycle cost of buses, including the logistics to supply fuel and maintenance requirements, should be used to inform procurement, as opposed to merely basing decisions on the price of the buses.

The Competition Commission presented preliminary findings from the Land-based Public Passenger Transport Market Inquiry in relation to the bus sector.

Among the key findings were the following:

- The relationship between the Passenger Rail Agency of South Africa (PRASA) (as custodian of key intermodal terminal facilities) and Autopax (as an active participant in the provision of interprovincial bus services) led to competition distortions.
- Big interprovincial bus operators abuse the objection process for obtaining operating licences. This delays and discourages entry.
- The provincial regulatory entities seem to have inadequate capacity and resources to monitor and oversee the provision of interprovincial bus services.
- No proper needs, or supply and demand assessments are done when considering applications.

The Commission was challenged on its interpretation of section 41 of the National Land Transport Act (negotiated contracts). While the Commission sees aspects of section 41 as promoting anti-competitive behaviour, differing views were expressed. Nonetheless, the opportunity to comment on the draft report would soon be extended to the public.

Four cities – Tshwane, eThekweni, Cape Town and Rustenburg – presented reports on their IPTN implementation progress. The cities lamented the cost of implementing full IPTNs and presented strategies on how the implementation costs are being reduced. The work stoppages resulting from community protests that demanded that construction work employs local labour have slowed down progress in some cities. The compensation of minibus taxi operators increases implementation costs substantially, even in small cities like Rustenburg. Understanding the local context, including climate, is important to reduce implementation and operational costs.

The Gauteng Department of Roads and Transport presented its draft document on norms and standards for public transport. Once adopted, the norms and standards will inform the systematic reporting of public transport service quality in Gauteng. The province was urged to consult widely before adopting the document. Opportunities to extend the document nationally should be explored.

The CSIR presented a toolkit that could be used to systematically measure the true sustainability of IPTNs. The toolkit is based on concepts of sustainability espoused by the United Nations. Furthermore, using the toolkit enables cities to measure backlogs more comprehensively. The toolkit was seen as useful, but needed to be calibrated even more for the South African context.

Empowerment opportunities in transport (Tshwane Women in Transport)

Session 4B, Thursday, 11 July 2019

The SATC 2019 was differentiated from the event format over the past 35 years by virtue of the inclusion of a day that was set aside exclusively to discuss women's issues in relation to transport. Initiated and organised by Tshwane Women in Transport (TWIT), the session was enthusiastically received by delegates. The TWIT is a non-profit organisation whose primary focus is the empowerment of women, with a special focus on transport. It is a member of South African Network of Women in Transport (SANWIT), which is currently housed in and supported by the Department of Transport.

The TWIT expressed its gratitude to the SATC organising committee for believing in it and creating a platform for it to showcase a partnership between a well-established conference and itself as an emerging organisation.

The following presentations were delivered by high-caliber speakers, who were very knowledgeable in their respective fields:

- "The social impact of current transport system" (Lesedi Mokoma)
- "Transport as terrain for women economic emancipation" (Yolisa Kani)
- "The role of legislation in transport safety and opportunities for women participation" (Alta Swanepoel)
- "Tripartite transport and transit facilitation programme" (Janette Botha)
- "The impotency of collecting digitalisation informally run public transport data in emerging cities" (Linley Rall)
- "Impact of drones on data collection" (Ivandra Udoyen)
- "Telemetric – the king pin toward connected fleets" (Monique Wadsworth)
- "Transport opportunities for women in transport" (Olga Mashilo)

The session also featured a special presentation by Theo Malele, who delivered a presentation on promoting accessibility to public transport.

The overall feedback from delegates was that this was a worthwhile initiative that is important to transformation and has the potential to continue to grow into a truly beneficial addition to the SATC offering. It provided a useful opportunity for networking, enabling delegates to learn from each other and consider how best to measure and increase women's participation, and derive benefit from the transport sector. The TWIT is keen to track and measure the opportunities that were created from networks established at the session and reporting back on those in 2020.

The convenors' experience during the conference can be summarised as follows:

- Organisations recognised the impact of the session.
- The TWIT concluded two partnerships after the conference, as well as sponsorship that will be detailed in 2020 as part of the feedback review.
- Many suggestions were received regarding the conference for 2020.
- Proposals were received to sponsor the TWIT at the 2020 conference.

- Another company offered in advance to deliver a presentation in 2020 and to allow their female staff members to register to attend the conference.

SATC 2020

The 39th annual SATC will take place at the CSIR ICC in Pretoria from 6 to 9 July 2020. The theme of the conference will be: "Sustainable transportation through enabling partnerships".