HIGH VOLUME TRANSPORT APPLIED RESEARCH

AMEND

FIA FOUNDATION

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INFRASTRUCTURE TOOLKIT FOR NON-MOTORISED USER SAFETY IN AFRICAN CITIES

Challenges and Solutions

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The views expressed are not necessarily those of FCDO.

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FOREWORD

If the Sustainable Development Goals are to succeed in the objective to 'leave no child behind', there are worse places to start than the roads and streets of Sub-Saharan Africa. Here a child is twice as likely to be killed by road traffic – by adults in control of high-speed metal – as anywhere else on Earth.

This shocking and neglected health inequality comes despite Africa having the lowest level of motorisation in the world, although this is rising fast. The fewest vehicles, yet the most dangerous roads. And as rapid motorisation combines with an unprecedented youth demographic explosion and booming urbanisation, the conditions are present for an epidemic of death, maiming, suffering and loss. And it is all preventable.

NGOs like Amend, working in African cities, rooted in local communities, have demonstrated, scaled and had peer-reviewed, relatively simple solutions that can protect children in traffic: Providing footpaths and safe crossings. Slowing vehicle speed through design, including the humble but effective speed bump. Directing children's predictable journeys – like the daily trip to school – away from heavy volumes of traffic. These measures are proven. When combined in a holistic strategy with police enforcement, public education, vehicle maintenance and regulation, and driver training, they can lock in casualty reduction even as cities grow.

Ensuring that vulnerable road users – especially children – can walk safely in their cities must be a priority for governments, development partners, private sector and civil society. Tackling road danger and improving walkability also benefits other SDG policy agendas, such as tackling climate change and lifestyle diseases, and enhancing child and youth wellbeing.

We have learned during the first year of the Covid-19 pandemic how important healthy lifestyles are to combat viruses, and the vital role safe streets play in that effort.

And we don't need to research a vaccine for this epidemic of road traffic injury. The advice contained within this toolkit is immensely practical and relevant to the real needs of urban Africa. It will undoubtedly help governments and others to design and build safe roads.

As we embark on the Second Decade of Action for Road Safety, and the global effort to achieve the road safety SDG targets by 2030, this toolkit could make a hugely valuable contribution. It is up to all of us to ensure that it does. For people and planet, let's design Africa's streets for life.

Saul Billingsley
Executive Director,
FIA Foundation

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INTRODUCTION

This toolkit has been developed to assist engineers to design and build safe roads in Africa's towns and cities.

Across Africa, urban areas are growing rapidly, and governments, often with the support of development partners, are building new roads and upgrading existing ones.

However, the vast majority of African urban dwellers do not own a car. For these people – who include hundreds of millions of children and youth – the predominant mode of transport is walking. If these people are to benefit from urban development, they must be considered in the design of towns and cities.

With the way that many urban roads are currently being designed and built, pedestrians and other non-motorised users (NMU) find themselves at particular risk. New smooth road surfaces allow for high vehicle speeds, with little designed-in segregation of non-motorised users from vehicles, and often ineffective speed control.

Pedestrian footpaths are too narrow, crossing points are incorrectly placed, speed humps lead to erratic acceleration, braking and swerving, road signs are not adhered to by drivers. As a result, a higher proportion of pedestrians die on African roads than in any other part of the world.

In many countries, the design manuals that engineers follow – and the training that they receive in university – do not provide them with sufficient solutions to ensure the safety of pedestrians and other non-motorised users.

The solutions to reduce the risk of pedestrian road traffic injury are well known. There are many excellent international manuals and guidelines describing these solutions.

However, they tend not to be targeted at an African audience as they do not address many of the specific challenges that engineers in African towns and cities face: motorcycle taxis riding on footpaths; climate-related difficulties with road paints; open drains; vendors blocking footpaths; the use of hand-drawn carts; and so on.

The solutions presented in this toolkit are designed to be practical, affordable and within the ability of engineers to implement.

We recognise that the challenge of improving the safety of pedestrians and other non-motorised users will not be addressed by infrastructure alone. But we believe that building Africa's roads, towns and cities safely now will have a dramatic impact on the safety and quality of life for generations to come.

This toolkit has been prepared by Amend, based on experience of working on pedestrian infrastructure improvements in more than a dozen countries in Africa, with the support of UK Aid and the High Volume Transport Applied Research Programme.

CHALLENGE 1:
ABSENCE OR DISCONTINUITY OF FOOTPATHS

Edward Echwalu (for Amend), Accra, 2016

Description

Paved roadways in pedestrian-populated areas with little or no provision made for pedestrians to walk safely along the road.

Footpaths do not exist at all or may have eroded over time.

In other instances, footpaths exist but lack continuity.

Risk to Non-Motorised Users

Pedestrians are forced to either walk on uneven paths along the roads or share the roadway with motorised vehicles.

SOLUTION 1: CONTINUOUS PEDESTRIAN FOOTPATHS

Design Principles

Every road that is in an urban setting should have a footpath that is segregated from the main carriageway.

Footpaths must be continuous, to allow uninterrupted pedestrian movement.

The height of the footpath should remain the same, with ramps for vehicles.

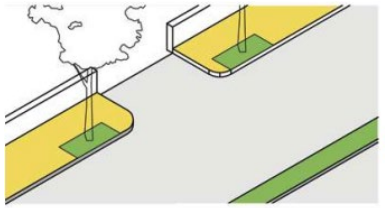
At points where vehicles cross the footpath, such as at property entrances, the pavement must be more robust than at points used only by pedestrians.

A minimum of 2 m clear width is recommended for footpaths.

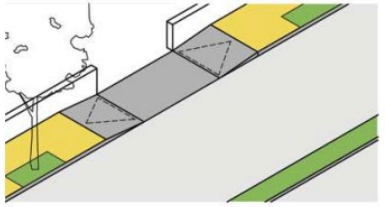
Benefits

Allows continuity for pedestrians along footpaths, reducing the need to walk in the roadway.

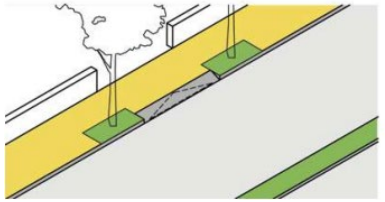
Considers the needs of people who use wheelchairs and other walking aids.



✘ Ending the footpath with abrupt curbs renders the footpath inaccessible for many pedestrians.



✘ Lowering the entire footpath to the level of the carriageway is unacceptable as property entrances may become waterlogged.



✔ Where required to provide the access to private properties, vehicle ramps should be provided in the furniture zone.

Local Application

Continuous pedestrian footpaths should be included in all new urban road projects.

Continuous pedestrian footpaths should be retrofitted where they do not currently exist.

Road width is often limited. In such cases, the provision of footpaths should be prioritised over the provision of vehicle road space.

Local Limitation

NMU-related policy needs to guide the adoption.

Institution for Transportation Development and Policy (ITDP)

Institution for Transportation Development and Policy (ITDP)

CHALLENGE 2:
ENCROACHMENT OF FOOTPATHS BY VENDORS

Amend, Dar es Salaam, 2019

Description

In areas such as markets and business districts where pedestrian population is high, vendors prefer to locate themselves along paths used by pedestrians, where their goods will be seen and get purchased.

These vendors tend to take up most, if not all, of the footpath width.

Risk to Non-Motorised Users

Pedestrians are displaced to either walk along a narrow path on the footpath or share the roadway with motorised vehicles.

SOLUTION 2: ALLOCATED VENDOR SPACE

Design Principles

Provide a space in which vendors can have easy access to pedestrian traffic. This means allowing wider footpaths: for example, 4 m – minimum of 2 m for vendors and 2 m for pedestrians.

Clear marking and designation of vendor spaces can help to prevent encroachment onto footpaths and cycle paths: for example, different finishing material could be used to differentiate vendor space from pedestrian space.

Benefits

Frees up the footpath, allowing for effective use by pedestrians.

Vendors have designated areas within which to operate.

Local Application

The footpaths should be wide enough to support both expected NMU traffic and expected vendor population.

Alternatively – if there is limited space – turning existing parking spaces into vendor spots can be an option, provided there is segregation from the main carriageway.

All vendors must be educated in the use of the designated area.

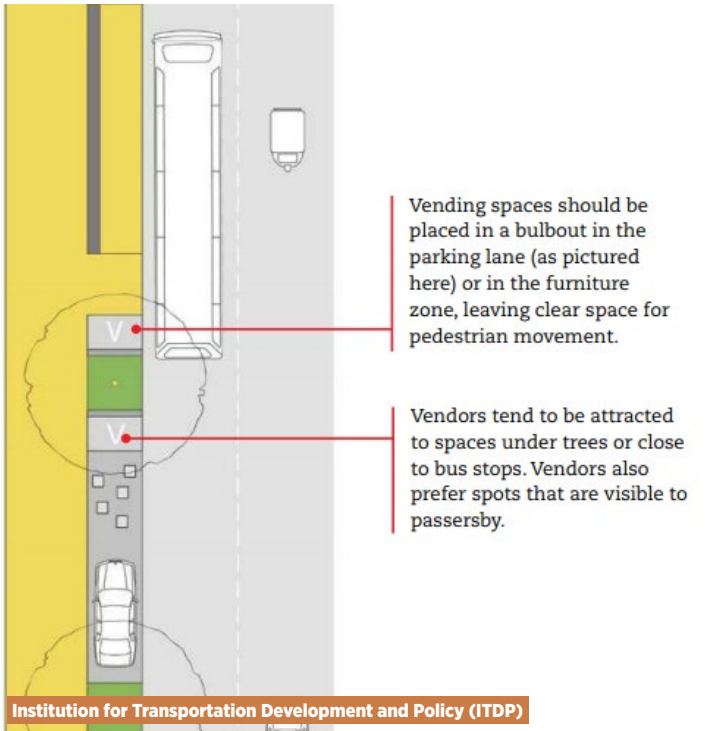
The limits for vendors' space should be clearly demarcated: for example, by using different paving materials on vendors' space vs pedestrians' space.

Local Limitation

Easily applicable only where footpath widths are wide or road reserve is sufficient for pavement extension.

If there is insufficient space, road space may need to be reclaimed from vehicles.

If there is not effective enforcement, then there could be challenges in compliance, making the vendor space redundant.



Institution for Transportation Development and Policy (ITDP)

Amend, Tanzania, 2020

CHALLENGE 3:
MISUSE OF FOOTPATHS AND PEDESTRIAN CROSSINGS BY MOTORISED VEHICLES

Amend, Dar es Salaam, 2020

Amend, Dar es Salaam, 2020

Description

Shop owners, shoppers, delivery vehicles, or taxis waiting for passengers use footpaths as parking bays where there is limited or no parking provision in business districts and major shopping areas.

Motorcycles and motorised three-wheelers drive along footpaths to avoid congested streets. Motorcycle taxis tend to park on footpaths at street corners, waiting for passengers.

Due to the small size of motorcycles and motorised three-wheelers, their operators tend to cross roads at designated pedestrian crossing locations, thus defeating the objective of separating motorised and non-motorised traffic at such locations.

Risk to Non-Motorised Users

Pedestrians and other non-motorised traffic are forced to walk along roadways where footpaths have been converted to parking bays.

Pedestrians are forced to step aside when speeding motorised vehicles are approaching, or risk being hit.

SOLUTION 3A: BOLLARDS

Design Principles

A simple precast, reinforced block (bollard) with some internal reinforcement that acts as a barrier to motorised vehicles.

The bollards should be strong enough to halt a vehicle moving at high speeds but flexible enough to absorb the impact of a motorized vehicle without entirely crushing it.

They should be set at least 1.5 m apart, making them wheelchair accessible.

Benefits

It has little resale value, minimising the risk of theft.

Easy to replace, in the case that it is damaged.

Local Application

These can be placed in urban areas to discourage larger motorised vehicles from parking or driving on pedestrian-dedicated areas.

Using bright colours on the bollards can help increase their visibility to people who are partially sighted.

Local Limitation

Without a proper maintenance plan, damaged bollards often remain damaged, leaving pedestrian zones exposed.

Bollards placed at 1.5 m intervals, to allow wheelchair access, also allow access for motorcycles.

Amend, Tanzania, 2020


Amend, Tanzania, 2020

SOLUTION 3B: MOTORCYCLE FOOTPATH BARRIERS

Design Principles

Designed to act as a physical barrier to restrict access by motorcycles at the start and end of a footpath.

Because of the turn radius and design of the opening, motorcyclists would not be able to pass through, whereas wheelchairs can easily pass through.

Benefits

Prevents motorcycles from riding on footpaths, thereby reducing the risk to pedestrians.

Local Application

Works well in urban areas that are known to have problems with motorcyclists using footpaths.

Areas with vulnerable pedestrians, such as schoolchildren, can use this barrier together with segregation measures, such as a furniture zone, fence, or bollards.

Local Limitation

Applicable in areas with low pedestrian volumes, as it could potentially become a bottleneck in heavily pedestrianised areas, such as marketplaces.

SOLUTION 3C: DESIGNATED PARKING INCLUDING COVERED MOTORCYCLE TAXI PARKING

Design Principles

Designated parking for all vehicle types.

Covered parking specifically for motorcycle taxis that will prevent the operators from encroaching the pedestrian and cycle facilities.

Benefits

Will reduce encroachment of footpaths by motorcyclists.

Prevents motorcyclists from picking up pedestrians at random points, since they will have a designated parking station.

Local Application

Motorcycle stands placed near key bus stops will cater to pedestrians, enabling multimodal transportation.

Existing motorcycle taxi parking location will give a good indicator of existing pedestrian flow.

Shelter from the elements will encourage motorcycle taxis to make use of the parking.

Local Limitation

The motorcycle taxi stands can be redundant, if not paired with education and enforcement.

CHALLENGE 4:
OBSTRUCTION OF FOOTPATHS

Amend, Accra, 2020

Description

Clusters of road signs, direction signs, advertisement signs, and utility posts installed on footpaths obstruct pedestrian movement.

Pedestrians are forced to manoeuvre their way around these obstructions as they travel along footpaths.

Where the obstructions are located at intersections, they obstruct the vision of pedestrians trying to cross the road.

Risk to Non-Motorised Users

Pedestrians may bump into these poles and posts while walking.

Pedestrians may have to step into the roadway to pass the obstructions, putting them at risk of being hit by a vehicle.

Pedestrians may attempt to cross the road without clear vision of approaching vehicles.

SOLUTION 4: ZONING SYSTEM

Design Principles

A zoning system should be used, with different zones allocated to different uses. For example:

- A frontage zone should be a minimum of 0.5 m.
- A pedestrian zone provides unrestricted pedestrian access. The clear width must be at least 1.5–2 m to accommodate two wheelchair users at the same time and must be entirely free of obstructions.
- A furniture zone is for placing items, such as lighting, signs, trees, utility boxes, and others, that could act as obstructions.
- Signs should be mounted at a minimum height of 2.1 m to ensure pedestrians can comfortably walk under them, if necessary.

Benefits

This helps to keep footpaths and cycle paths clear of any obstruction.

The furniture zone can serve a dual-purpose for segregation of non-motorised users and vehicles.

The furniture zone can also be used as a green area in the urban space, with trees and bushes.

Local Application

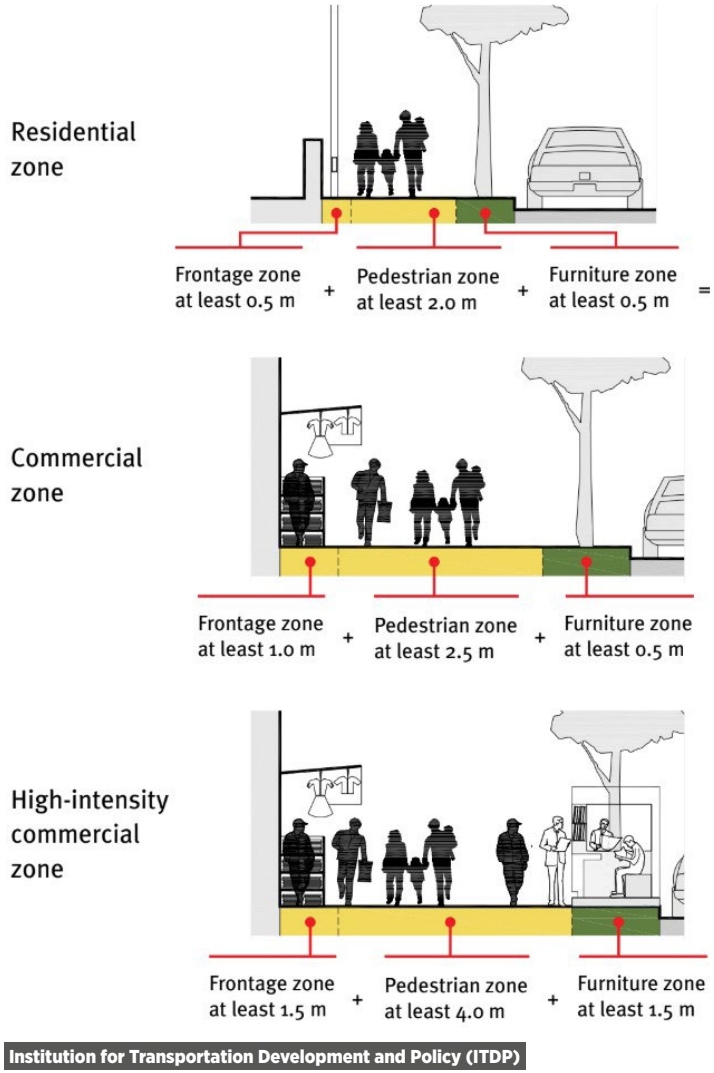
The different zones may need to be different widths, depending on the use of the roadside properties. Widths should not be less than those in the diagram.

Factors, such as land use and non-motorised and motorised user volume, need consideration.

Local Limitation

Zoning is more effective when there is ample carriageway width or road reservation for implementation; this can be a challenge in existing urban roads in African cities.

Zoning can pose many challenges in densely populated and unplanned areas particularly, requiring effective enforcement in the designated uses for each zone.



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CHALLENGE 5:
FADED OR ABSENT ZEBRA CROSSINGS

Amend, Dar es Salaam, 2020

Description

Faded, discoloured, or absent zebra crossings mean that motorised vehicles do not realise that they are at a crossing point where pedestrians have priority.

Thermoplastic paints are the most common road-marking paints used in African cities.

Thermoplastic paints, however, easily discolour or fade (sometimes within days) in hot, humid, and dusty environments, and road authorities often do not have the resources for frequent repainting.

Risk to Non-Motorised Users

Pedestrians risk being run over by unyielding motorised vehicles, when crossing at poorly demarcated zebra crossings.

SOLUTION 5A: COLD PLASTIC ROAD-MARKING PAINTS

Design Principles

Cold plastic road paints have been found to be significantly more durable than thermoplastic paints.

Benefits

The use of cold plastic paints ensures the visibility of zebra crossings for a longer period of time, reducing the risk that paint will fade and the crossing point will be unseen.

Local Application

Cold plastic paints should be used for all road markings, in particular for zebra crossings.

While the initial cost of cold plastic paints is greater than of thermoplastic, the cold plastic paint is significantly more durable, thereby providing better value for money.

Local Limitation

Cold plastic paints are not yet approved for use by regulatory bodies in all countries, and in some countries where they are approved market availability is limited.

Thermoplastic (left) vs cold plastic (right): 3 months after first application, Amend, Accra, 2019

SOLUTION 5B: RAISED PEDESTRIAN CROSSINGS WITH PIGMENTED BLOCKS

Design Principles

As road-marking paints in many African cities are found not to last long, an alternative is to use pigmented paving blocks to construct raised zebra crossings.

The aim of using pigmented blocks is to eliminate the need for road-marking paints in the first place.

Benefits

The coloured blocks ensure that the crossing point can be seen.

They also offer value for money, as there is no need for re-marking, as is the case with road-marking paints.

The raised zebra crossing also has the added benefit of calming traffic at a location where pedestrians are interacting with motorised vehicles.

Local Application

Pigmented paving blocks are made with locally available materials which meet durability and strength standards.

Local Limitation

Higher initial construction costs than road paints.

Non-reflective nature of some pigmented blocks.

Owain George (for Amend), 2020

Amend, Accra, 2020

CHALLENGE 6:
FAILURE OF DRIVERS TO STOP AT PEDESTRIAN CROSSINGS

Edward Echwalu (for Amend), Lusaka, 2016

Description

At zebra crossings, some vehicles may stop for pedestrians to cross, while another vehicle overtakes the vehicle that has stopped.

At signalised pedestrian crossings, motorcycles and motorised three-wheelers, particularly, are known to ignore the signals and drive through the red light.

Risk to Non-Motorised Users

Pedestrians fail to see the approaching vehicles while crossing the road, resulting in crashes.

Pedestrians face the risk of being hit, particularly by motorcycles and motorised three-wheelers at pedestrian crossing points.

SOLUTION 6: ZIGZAG LINES

Design Principles

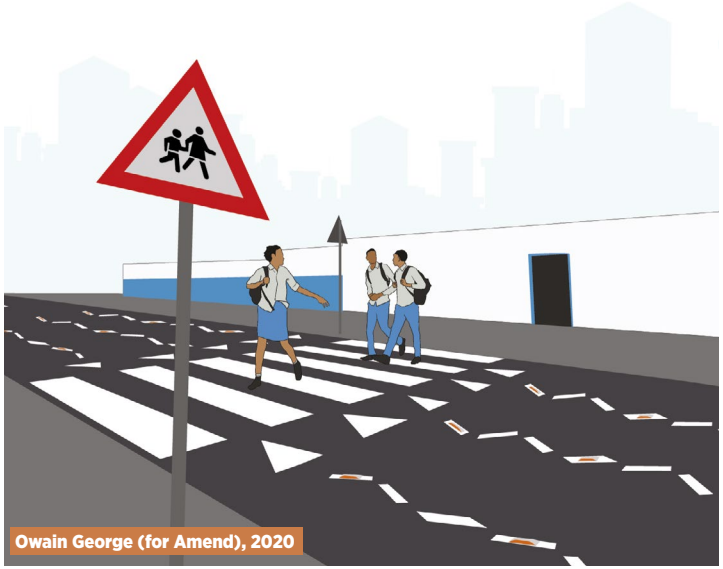
Zigzag Lines act as visual cues to drivers as they approach pedestrian crossings, to remind them to stop.

Overtaking is not allowed in a zigzag-marked area.

Parking is also not allowed on zigzag markings.

Benefits

Drivers are more likely to recognise that they are approaching a pedestrian crossing when it is preceded by zigzag lines.


Owain George (for Amend), 2020

Local Application

More durable road paints (for example, cold plastic) should be used for zigzag markings. Reflective studs could also be placed on zigzag markings for better visibility.

Local Limitation

All categories of road users will need to be sensitised about this, for effective operation.

CHALLENGE 7:
INADEQUACY OF SPEED-CALMING MEASURES


Edward Echwalu (for Amend), Accra, 2016

Description

Drivers use inappropriately high speeds in areas of high pedestrian activity.

Traditional traffic-calming measures are often inadequate on paved local roads.

No effective solutions for traffic calming on unpaved roads.

Risk to Non-Motorised Users

Speeding vehicles risk killing or seriously injuring pedestrians.

SOLUTION 7A: KERB EXTENSIONS

Design Principles

Kerb extensions decrease the overall width of the roadway and can serve as a visual cue to drivers that they are entering a neighbourhood street or area with heavy pedestrian volumes.

Raised kerb extensions narrow the travel lane at junctions.

They pedestrianise junctions by shortening the crossing distance and decreasing the kerb radii, thus reducing turning-vehicle speeds.

Benefits

Reduce the crossing distance for pedestrians, minimising the length of time that pedestrians are at risk while crossing the road.

Encourage slower speeds of turning vehicles.

Local Application

For use in urban areas with high levels of interaction between vehicles and NMUs.

Can be retrofitted to existing roads.

Local Limitation

Applicable only where there are paved roads.

National Association of City Transportation Officials (NACTO)

SOLUTION 7B: TWO-WAY CHICANE

Design Principles

Chicanes are one type of horizontal deflection, formed by building out the kerb line to narrow the carriageway, usually on alternate sides of a two-lane, single-carriageway road.

The build-outs may be combined with central islands and overrun areas. Drivers reduce speeds to negotiate the lateral displacement in the vehicle path.

Benefits

Lowers motorized traffic speeds, either in areas with high levels of pedestrian movement or on the approach to a pedestrian crossing.

As an alternative to speed humps, it offers reduced discomfort to drivers and passengers.

Local Application

Can be useful on straight streets, combined with mid-block crossings, to enhance pedestrian safety.

Bicycles can have a separate path next to the footpath.

Bus stop can be incorporated as part of the speed-reduction measures.

Local Limitation

Can be a challenge to apply on roads that have a limited corridor for implementation.

There is little understanding and experience on the use of chicanes in African countries.


World Resources Institute (WRI)

wikimedia.org

SOLUTION 7C: SHARED STREETS

Design Principles

Shared streets are designed to slow traffic speeds, using pedestrian volume, design, and other cues.

Mixed land use contributes to a walkable environments for pedestrians.

Clear paths should be maintained to prioritise vulnerable road users.

Tactile paving is a necessity for the blind, in a scenario with mixed traffic.

Kerbs and surface treatments provide unusual geometries to encourage reduced speeds.

Surface treatment/paving material should be such that it would be uncomfortable for a driver to proceed at high speeds.

Benefits

Vehicles automatically lower their speeds when approaching shared streets.

Promotes walking and cycling.

Reduces journey times, if general traffic volumes are reduced.

Local Application

Appropriate for market areas and business districts with high numbers of vendors and high levels of pedestrian movement and low motorised traffic flow.

Local Limitation

Management of such streets can be challenging, if there is no strong enforcement.

Policy would be needed to provide criteria for provision and maintenance of shared streets.

This would require wide-area planning for effective and efficient operations.

National Association of City Transportation Officials (NACTO)

Institution for Transportation Development and Policy (ITDP)

SOLUTION 7D: RAISED INTERSECTIONS

Design Principles

Create a small area of shared space at a junction, increasing the level of priority for pedestrians and forcing vehicles to reduce to very slow speeds.

Slope of entrance ramps for motorised traffic can be steep or gentle, depending on target speeds.

Use different paving materials to further draw attention to raised intersections.

Appropriate warning signs and roadway markings should accompany raised crossings.

Local Application

Appropriate for junctions with high numbers of pedestrians.

Benefits

Significantly reduces vehicle speeds, increasing the safety of pedestrians crossing to the opposite side of a street.

Drivers become more aware of pedestrians' presence.


World Resources Institute (WRI)

CHALLENGE 8:
OPEN DRAINS

Amend, Accra, 2020

Sala Lewis (for Amend), Dar es Salaam, 2015

Description

Some roads in urban areas are characterized by having steep, deep, or wide open drains.

These drains are easier to construct and more cost effective but present a challenge for pedestrians, who are sometimes forced to walk over, and even in, the drains when there are no footpaths.

Risk to Non-Motorised Users

Pedestrians are at risk of falling into the deep drains, more so when there is limited, or no, pedestrian footpath alongside the road.

In the case of a vehicle veering off the road, pedestrians may have nowhere to go except these dangerous drains.

SOLUTION 8A: COVERED DRAINS

Design Principles

Drains can be covered with concrete slabs to prevent pedestrians from accidentally falling into them.

The concrete-slab covers should not double as footpaths, since the gaps between each slab, which collect water into the drain, can be a trip hazard for pedestrians.

Local Application

Drains should be covered in urban areas with high levels of pedestrian movement.

Benefits

They can be retrofitted into already existing open drains.

They are much more cost-effective than underground drainage systems.

They are environmentally friendly, in that they help reduce the amount of litter that ends up in the drain.

Local Limitation

Covered drains are notorious for clogging, particularly during the rainy season, and are harder to maintain than open drains.

Even though they are cheaper than underground drainage systems, covering entire lengths of open drains has significant cost implications.

https://supplymaster.store/products/concrete-u-drain-cover-slap

SOLUTION 8B: PEDESTRIAN BRIDGE

Design Principles

Where a footpath crosses an open drain, a pedestrian bridge should be provided.

Pedestrian bridges over a drain or road or at any height must have a railing to protect people from falling.

Pedestrian bridges leading to a road should lead to a pedestrian crossing.

Benefits

Pedestrians can cross drains safely and are kept safe from falling.

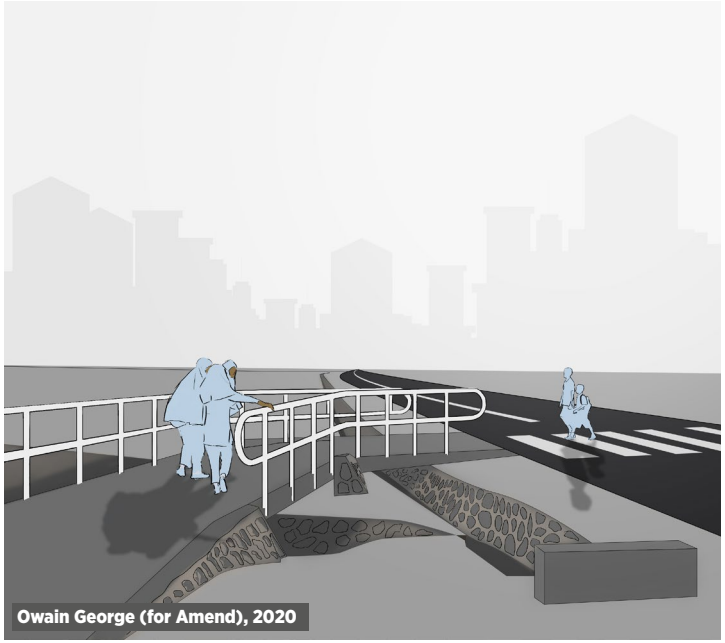
Local Application

This pedestrian bridge can be used to replace makeshift bridges, often made from wooden planks.

It is essential that bridges are located along pedestrian desire lines.

Local Limitation

If bridges are not placed along desire lines, pedestrians will resort to jumping over the drain or creating another temporary bridge.



Owain George (for Amend), 2020

CHALLENGE 9:
ABSENCE OR DISCONTINUITY OF CYCLE WAYS

Edward Echwalu (for Amend), Accra, Ghana, 2016

Description

Although it is affordable, cycling is generally an unpopular mode of transport in African cities, for reasons that include risk of road traffic crashes.

The absence of dedicated cycle lanes and discontinuity due to the lack of a network around cities deter many people from shifting to this mode of transport, despite the health and environmental benefits.

Cyclists who ride along busy urban streets find it unsafe, since they often must share the road space with motorists who tend not to give much consideration to them.

Some cyclists resort to riding along quieter local and residential roads, which makes journeys longer.

Risk to Non-Motorised Users

Often with no lights, reflectors, or helmets and receiving little respect from vehicle drivers, cyclists are at high risk of road traffic injury.

SOLUTION 9A: CYCLE PATHS

Design Principles

A dedicated path for cyclists, physically separated from motorised traffic.

The cycling path width should be sufficient to allow cyclists to overtake each other: a minimum of 3 m.

3.5 m–4 m width will allow for the circulation of freight tricycles, tricycle wheelchairs, carts, bicycle-taxis, carriages, and other types of non-motorised vehicles.

Cycle paths should be part of a network.

Benefits

Separated paths increase the safety, mobility, and comfort of cyclists and other NMUs.

Reduction of travel time for cyclists, if the paths are well planned and continuous.

Local Application

Preferable on long stretches that do not have intersections.

Where there is a high potential for vehicle-bicycle collision.

Where major intersections are widely spaced (every 100–200 m).

Local Limitation

Separated cycle paths reduce cyclist visibility, which makes them vulnerable at intersections.

Amend, Tanzania, 2020


United Nations Environment Programme (UNEP) / V.RuizStannah

SOLUTION 9B: INTERMITTENT KERBS TO PROTECT CYCLE LANES

Design Principles

Used to protect cycle lanes that run adjacent to motorised vehicle lanes.

Precast-concrete raised kerbs that are placed at regular intervals act as a buffer for a cycle lane against motorised traffic.

The intermittent kerbs are typically 150 mm high and spaced at around 500 mm intervals, allowing a bicycle but not a car to get through.

Local Application

Reflective studs can be used along intermittent kerbs, to ensure visibility at night.

Benefits

The intermittent kerbs serve as a form of protection for cycle lanes in many African cities, where a single road-marking separating the motorised vehicle lane from the cycle lane is generally not respected by motorised vehicles.

Cyclists are protected from motorised traffic but are not “locked” into the lane and can cross the road, easing their mobility.

Local Limitation

When not paired with enforcement, intermittent kerbs can be ineffective in preventing motorcycle riders from riding on the cycle lanes.

They can act as a trip hazard for pedestrians, particularly at crossings.

Owain George (for Amend), 2020

SOLUTION 9C: PUBLIC BICYCLE PARKING

Design Principles

Designated parking spaces for bicycles are important to facilitate the mobility of cyclists.

Preferred spacing between stands is 1 m.

Stands should be detectable by all, including partially sighted or blind persons. This can be done by providing tactile paving.

Benefits

As an addition to well-developed cycle paths and lanes, it can encourage more people in cities to cycle, which promotes public health and is better for the environment.

Local Application

There should be a clearance of 550 mm or more between the parking and any objects.

Public bicycle parking needs to be located near pedestrian desire lines and closer to the road than buildings.

Stands should not create an obstruction for other road users.

Local Limitation

If not paired together with awareness campaigns, there is a chance that the facilities may end up not being used, more so in cities where cycling is viewed as a low-income mode of transport.

There is the risk of theft of the cycle stands.

CHALLENGE 10:
LACK OF PROVISION FOR MANUALLY OPERATED CARTS


Amend, Accra, 2020

Description

Many urban streets have the presence of manually operated carts providing transportation of goods.

In most instances, they are forced to use the main carriageway, due to the limited space, with footpaths often being obstructed or not wide enough to accommodate them.

Risk to Non-Motorised Users

Carts are at risk of being hit by motorised vehicles, since they move at much lower speeds and sometimes in different directions than traffic.

Most carts do not have lights or reflectors, increasing the risk at night.

SOLUTION 10: ROAD SHOULDERS TO ACCOMODATE PULL/PUSHCARTS

Design Principles

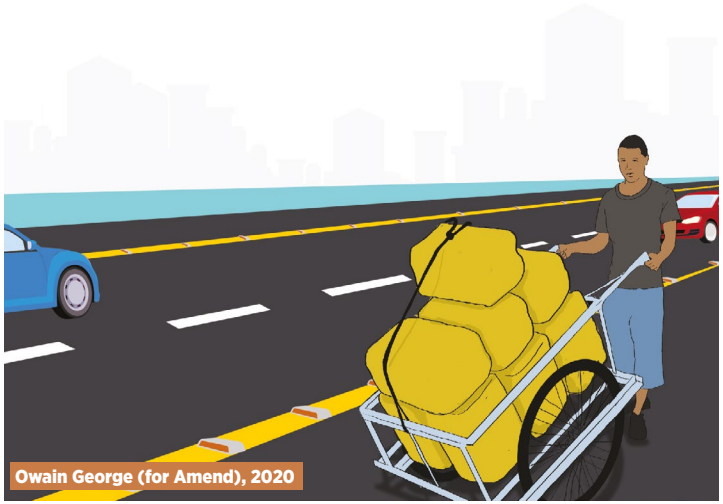
A section of a carriageway that has been marked for the exclusive use of carts (possibly an existing road shoulder).

Separation can be visual, marked by paint with reflective studs for visibility at night.

For streets where car speeds do not exceed 30 km/h, the minimum lane width is 1.80 m.

Benefits

It segregates carts from faster-moving motorised vehicles, reducing the possibility of crashes.



Owain George (for Amend), 2020

Local Application

Easy to implement without major infrastructure changes.

Along already-existing roadsides with adequate shoulder width.

Local Limitation

Enforcement could be a challenge where motorcyclists would prefer to use those lanes to avoid traffic congestion.

May be difficult to implement in areas with a narrow road reserve.

CHALLENGE 11: INADEQUATE PROVISION FOR PERSONS WITH DISABILITIES

Amend, Dar es Salaam, 2020

Description

Persons with disabilities of various forms – physical, hearing, visual, or cognitive impairments – have been overlooked in road infrastructure development.

The experience of this group of NMUs while moving around tends to be unpleasant and dangerous.

Risk to Non-Motorised Users

Lack of consideration in infrastructure development for people with disabilities exposes them to greater risk of road traffic injuries.

Wheelchair users tend to ride along roadways rather than on non-existent, narrow, or obstructed footpaths.

Those with impaired hearing and/or sight are at risk of road traffic injuries, due to lack of the required infrastructure to help them perceive their environment and navigate the road space.

Drivers are unlikely to give consideration to people with disabilities that cannot easily be recognised.

SOLUTION 11A: ROADS SIGNS FOR PEOPLE WITH DISABILITIES

Design Principles

Dedicated road signs can be used to indicate the presence of people with disabilities.

Benefits

When paired with enforcement and education, these signs can reduce the risks to people with disabilities when walking along and crossing roads.

Local Application

Dedicated signs should be installed in areas with movement of people with disabilities, such as schools with disabled pupils, hospitals, and organisations that support people living with disability.

The appropriate signs should also be used for the appropriate disability, so that drivers know what to expect.

Local Limitation

There has been very little regard for signs for people with disabilities in Africa, in general; hence, most of these signs will be new to drivers.

Motorists need to be educated on the meaning and appropriate actions that need to be taken when seeing such signs.

Amend, Dar es Salaam, 2020

SOLUTION 11B: KERB RAMPS (FOR WHEELCHAIR USERS)

Design Principles

Kerbs should be sloped to allow wheelchair users access to footpaths.

Kerbs should not obstruct the free passage of wheelchair users.

The minimum width of a two-way wheelchair traffic passage is 1.5 m. The preferable width is 2.0m.

Benefits

With kerb ramps, wheelchair users will be able to access areas that lack motorised facilities.

This is also beneficial to cyclists and other pedestrians.

United Nations Enable: Accessibility for the Disabled: A Design Manual for a Barrier-Free Environment

Local Application

At all pedestrian crossings that are not at grade.

In all areas where kerb ramps are installed, there should be smooth transitions at the end and beginning of the ramps, to prevent sudden drops and obstructions that can hinder access by wheelchair users.

Local Limitation

Applicable only where paved footpaths available.

SOLUTION 11D: PELICAN CROSSING WITH ROTATING CONE (FOR VISUALLY AND HEARING IMPAIRED)

Design Principles

Pelican crossings have features that are designed to help visually impaired and hearing impaired people to cross the road.

They produce a beeping sound that helps visually impaired people to know when it is safe to cross.

They have a rotating cone that can be felt by hearing impaired people to help them know when to cross.

Benefits

The beeping sound at the rotating cone helps people with hearing and sight impairment to cross the road safely.

Local Application

Many of the people living with disabilities would need education on how to use pelican crossings.

These crossings must be paired together with road signage to alert drivers to the presence of people with disabilities.

Local Limitation

It must be paired with proper awareness on their use, otherwise even the people with disabilities may not make use of it, and motorcyclists particularly could violate red signals, as they are known to do in many places.

Such devices are not readily available in most African countries and must be imported.

There is a risk of theft of the equipment.

CHALLENGE 12:
VISIBILITY OF NON-MOTORISED USERS AT NIGHT


EPA/Nic Bothma

Description

Many urban streets are dark or poorly lit, due to a lack of or malfunctioning streetlights.

Risk to Non-Motorised Users

Pedestrians are not visible when attempting to cross roads, putting them at risk of being hit by vehicles.

Non-motorised users also face personal safety challenges, such as robbery and assault along dark streets.

SOLUTION 12: SOLAR-POWERED LIGHTING

Design Principles

Where streets require lighting, the placement of the lighting should be an integral part of the street design, catering to vehicles and non-motorised users alike.

Solar-powered lighting can help to get lighting in areas that have limited electricity supply.

Benefits

Even during power outages, the streets can remain lit, providing road safety and personal safety.


United Nations Environment Programme (UNEP) / Phillips

Local Application

Lighting should be placed in such a way that it does not act as an obstruction to non-motorised users, including with consideration for wheelchair users.

The lighting posts can be painted in bands of contrasting colours, to prevent visually impaired people from colliding with the lamp posts.

The solar panels should be low-cost and easy to replace.

Local Limitation

There is the potential of vandalism or theft of solar panels after their installation.

Maintenance plans must be put in place to ensure non-functioning streetlights are kept operational at all times.

HIGH VOLUME TRANSPORT APPLIED RESEARCH

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UKaid from the British people

transport-links.com

INFRASTRUCTURE TOOLKIT FOR NON-MOTORISED USER SAFETY IN AFRICAN CITIES

Challenges and Solutions

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