

# Safety Aspects in Designing & Constructing Roads

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Federación Internacional de Carreteras



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3. Design for All Road Users;
4. Undertake Road Safety Audit;
5. Speed Management and control;
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# 1. Road Safety Situation in TZ

- In year 2018, about 3,464 accidents happened that cause more than 1,672 people dead and 3,472 people injured;
- About 60% of all accidents are happening on trunk and regional roads;
- The main reasons of accidents according to Police is reckless driving, over speeding, fault vehicles and road environment.

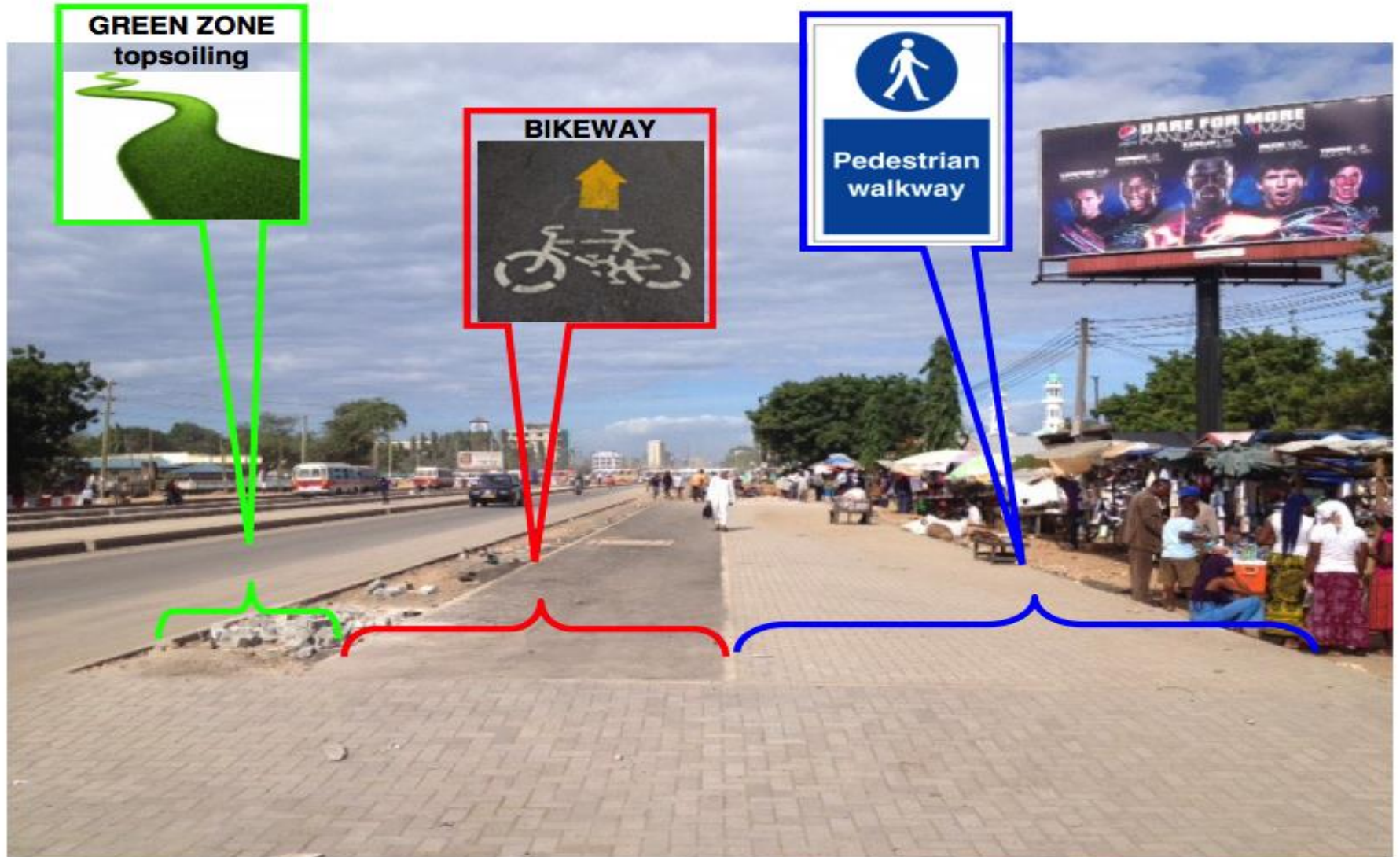
## 2. Efforts Made by TANROADS

- participants get understanding of the Efforts made by TANROADS to ensure safer roads in design and construction;
- Design for all road users, undertake RSA, Speed Management; safe overtaking; road alignment, forgiving road sides; etc
- Remember the Roads Act 2007 places a legal duty on all road authorities to promote safety when designing, building and maintaining their roads

# 3. Design for all road users

- The safety improvement includes provision of cyclists path, walkway, rest areas, speed calming to villages, placement/ or replacement of road signs and road markings
- Where there is a lot of VRUs reduce speeds
- In towns try to segregate pedestrians from traffic (footways, barriers)
- In towns provide crossing facilities at busy crossing points (zebras, signals, refuges)

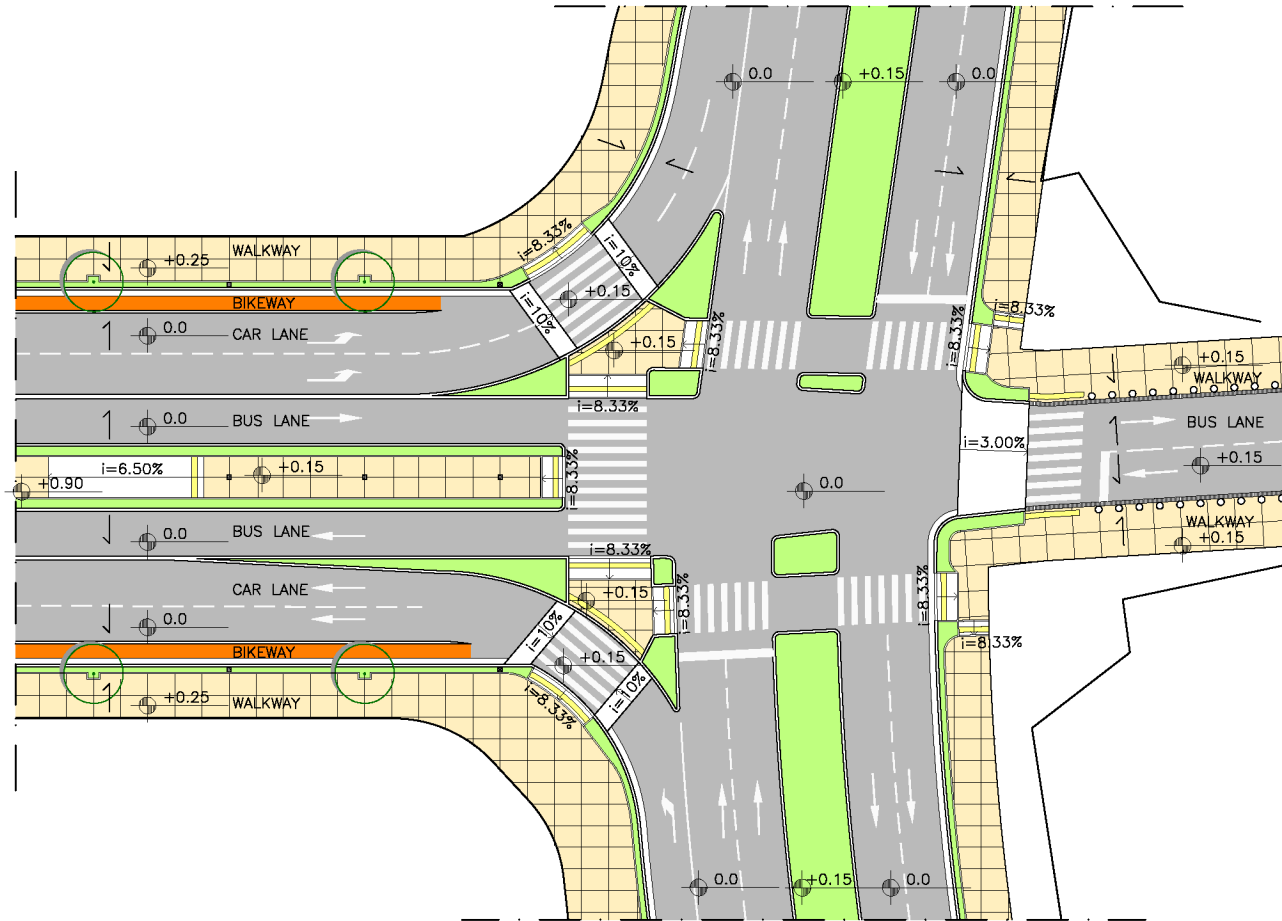
# Design for Vulnerable Road users





Footbridges are not an ideal solution

# Design Safe Pedestrian Crossing points



# 4. TANROADS Conduct RSA

TANROADS undertake RSA in all six stages including:

1. Stage 1 Feasibility Study;
2. Stage 2 – Preliminary Design;
3. Stage 3 – Detailed Design;
4. Stage 4 – Road Works;
5. Stage 5 – Pre-opening; and
6. Stage 6 – Post opening and existing road

# Method for undertaking RSA

TANROADS has 3 option for conduct RSA

1. In-house audit teams: This option is quick, economical and easy to arrange;
2. Using Independent Consultant: this ensures that audit is independent;
3. Instruct Design Consultant to do the audit: This option may have conflict of interest.

# TANROADS Conduct RSA!!



# 5. Manage speeds through design

This means designing roads to encourage / force drivers to travel at appropriate speeds

Wide, straight, level road = FAST

Narrow, curvy road = SLOW

# Speed and Crash Risk

A 10% reduction in av. speed gives:

- 10% reduction in minor crashes
- 20% reduction in serious crashes
- 40% reduction in fatal crashes

A pedestrian has little chance of surviving when hit by a car travelling at greater than 50km/h

# Main roads through villages

- Excessive speed through villages is a major problem.
- Traffic calming features, such as road humps, can be very effective in preventing collisions with pedestrians – are essential
- Do not rely on speed limit signs alone to reduce speeds



Ineffective - driver sees no reason to slow down

## 6. Provision of Climbing Lanes

TANROADS always provide auxiliary climbing lanes to ensure safe overtaking and increase efficient;

If there is misuse of climbing lanes by downhill to overtake may lead to head-on collision;



Provision of Climbing lanes increase safe overtaking opportunities

## 7. Provide a forgiving roadside

Design the roadside so that drivers who run off the road can recover control without crashing – create a “**Clear Zone**” in which there are no hazards (trees, poles, high kerbs, big drops, etc.)

If you cannot remove the hazard, sign it well, and shield it with crash barrier – but remember that crash barrier is not 100% effective.

# Road Safety Measures





## steel beam crash barrier:

- Not capable of stopping trucks and buses
- Often not installed over a long enough section
- Posts too widely spaced
- Ends are not terminated safely
- No transition between barrier and rigid bridge parapet

# Inadequate road side slope



## 8. Alignment is easy to read

Design the road alignment so that there are no nasty surprises (such as a sharp bend after a long straight section) – if you cannot do this, make sure the hazard section is well marked, and consider using crash barrier



Sharp bend chevron sign plus delineators



# Reflective signs and delineators at night



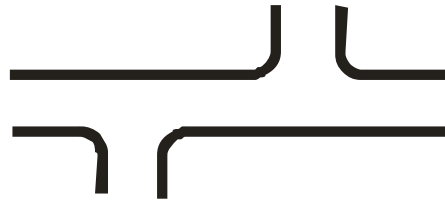
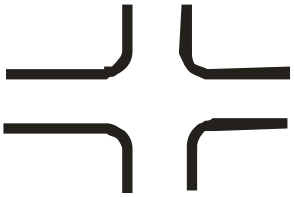
# 9. Design safer junctions

- No cross-roads
- Good approach visibility
- Speed of vehicles is controlled
- Channelisation to guide the path of vehicles, and reduce speeds
- Priorities made clear by signing
- Consider needs of VRUs
- Don't mix junction types on one route

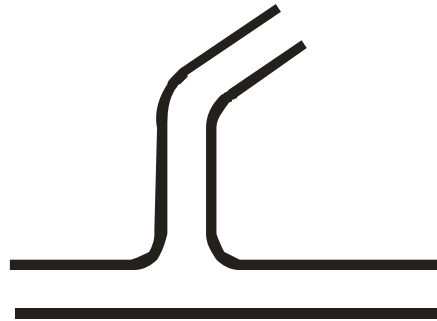
**Undesirable**

**Desirable**

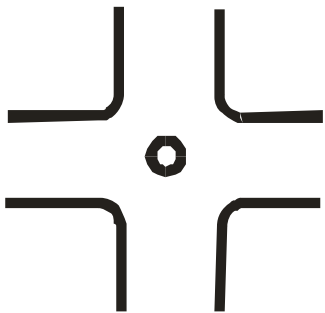
**Principle Applied**



Reduce the number of conflicts. Control speed.



Improve visibility for traffic entering the main road. Control speed.

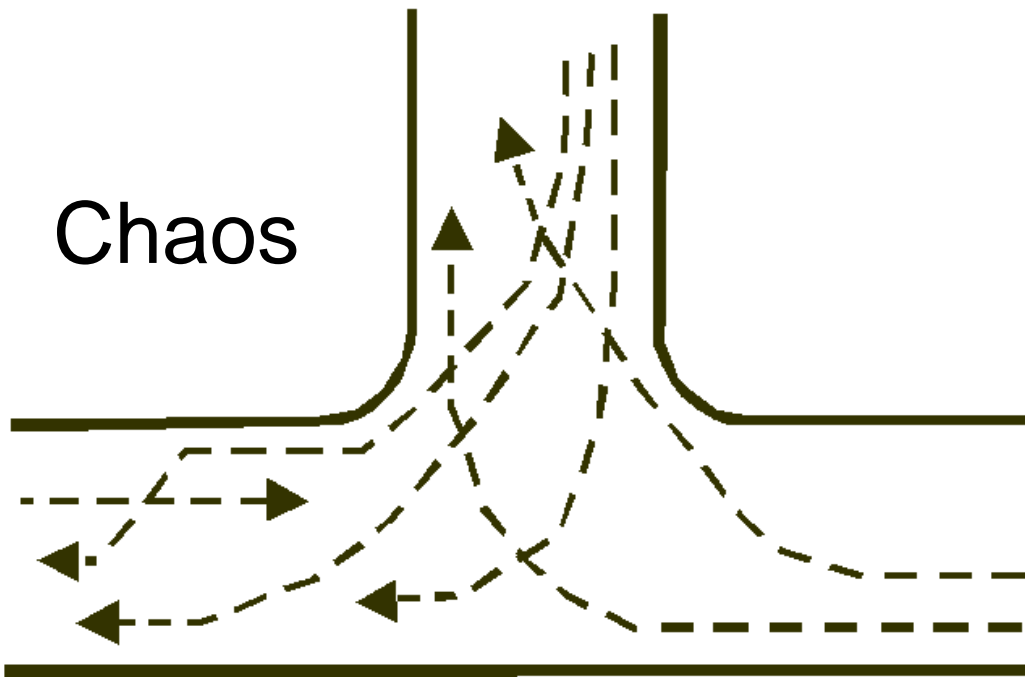


Provide splitter islands and larger centre island in order to control speed.

# Junction layout principles

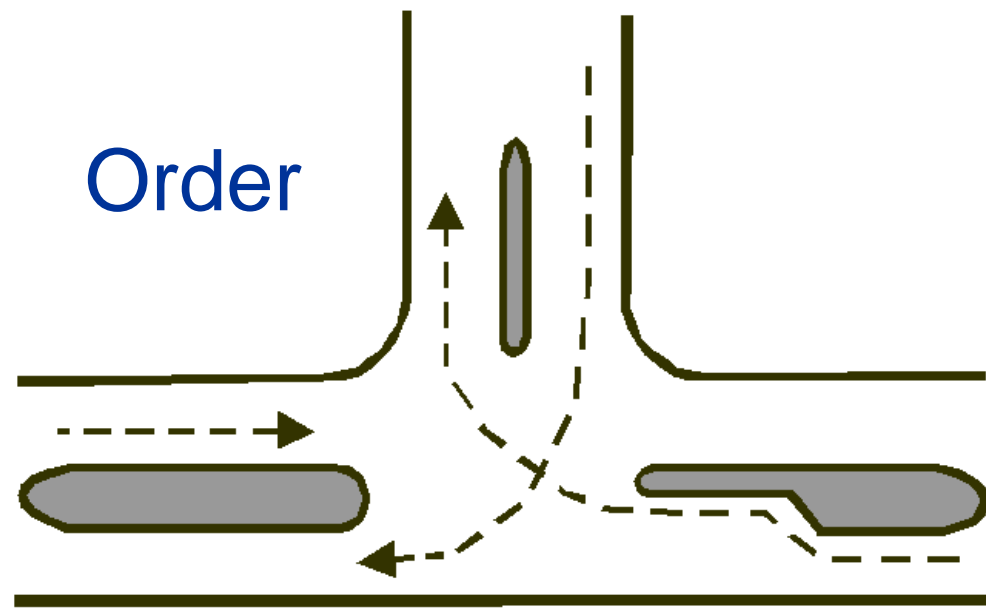


Chaos



**Channelisation  
of junctions -  
from chaos to  
order**

Order



# Challenges Facing TANROADS

1. Inadequate funds for implementing Road Safety measures;
2. Vandalism of Road furniture causes high levels of road accidents;
3. High costs of electric bills for operating Street lights and traffic signals;
4. Overloading vehicles damaging road infrastructure;
5. Encroachment of street vendors, vehicle parking on walkways create accidents to road users

# The Way Forward

- To ensure the Road Safety Audit are done to all six stages;
- Training project engineers and site Inspectors o how to conduct RSA;
- Control weight of Goods vehicles;
- Timely replacement of damaged road furniture and signs;
- Implementation of safety measures to the identified blackspots using available funds

# THANKS FOR LISTENING!!!!

