Assessing the risks unsignalized intersections posed to pedestrians using Unmanned Area Vehicles (UAVs) on Tubman Boulevard in Monrovia

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Presentation Content

- Basic Understanding of Road Safety Action International (RSAI)
- Background of the Research
- The Problems and Objectives
- Data Preparation - Methodology
- Observations gathered from Pedestrian & Vehicle interactions
- Pedestrians Hazard and Risk analysis on the TB
- Conclusion and Recommendations

Introduction - Road Safety Action International (RSAI)

RSAI – is a for-impact institution working to make roads safe in Africa, with its first operation opened in Liberia, West Africa and expansion works for Sierra Leone, Gambia, and Ghana.

Our core function is the prevention of road accidents. And as a for-impact, the need for strong evidence-based data and insights to convince stakeholders (both road users and decision-makers) is paramount (can not be overstated.

Henceforth, conducting research in the road safety, especially within cities and communities in which road accident is alarming has become one of RSAI primary approaches

This research on Tubman Boulevard in Monrovia, Liberia is as a result of the above understanding and efforts

RSAI | Road Safety Action International

SAFE ROADS, SAVE LIVES

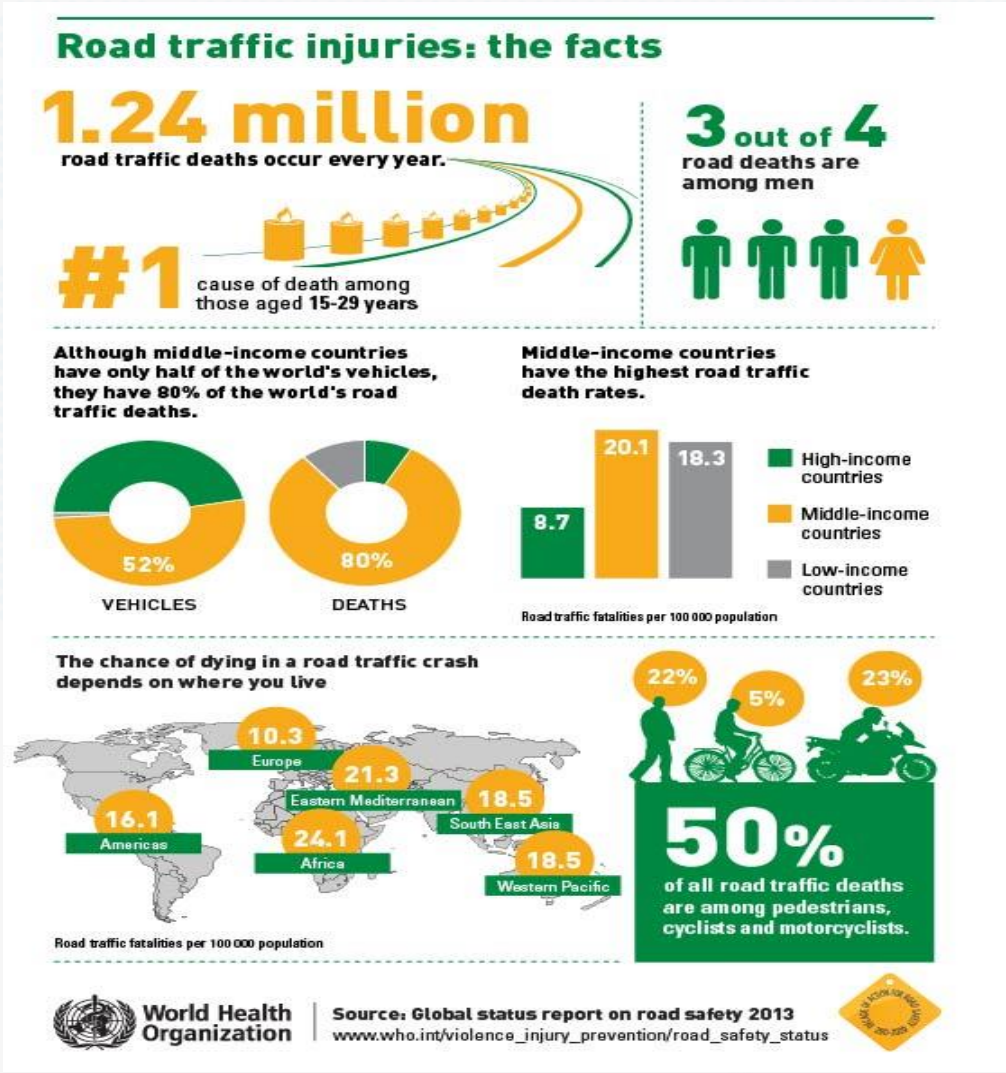
IRF GLOBAL 75 YEARS

Introduction

As the eighth leading cause of death for all age groups, road accidents account for approximately 1.35 million deaths and over 50 million injuries worldwide (WHO Global Status Report, 2018).

- In 2018, countries across Africa and Southeast Asia experienced regional road death rates surpassing the global average for road traffic fatalities, with rates of 26.6/100,000 people and 20.7/100,000 people respectively

- 1,657 people every year in Liberia
- The victims are mostly pedestrians, motorcyclists, and cyclists,
- 7% loss of Liberia's Gross Domestic Product (GDP).
- average of 1,208 accidents occurred each year



Introduction

Tubman Boulevard connects the Central Business District (CBD) with the Industrial Zone of Liberia and the residential district of Monrovia

Tubman Boulevard witnesses a constant flow of traffic of approximately 49, 122 vehicular and 17,880 pedestrians

The length of the TB used in this study 11.2km

The Research Problem

Monrovia emerged as the nation's hotspot for road traffic accidents, accounting for 48 percent of total accidents, 60 percent of total injuries, and 77.8 percent of total vehicle damage over the 10-year period.

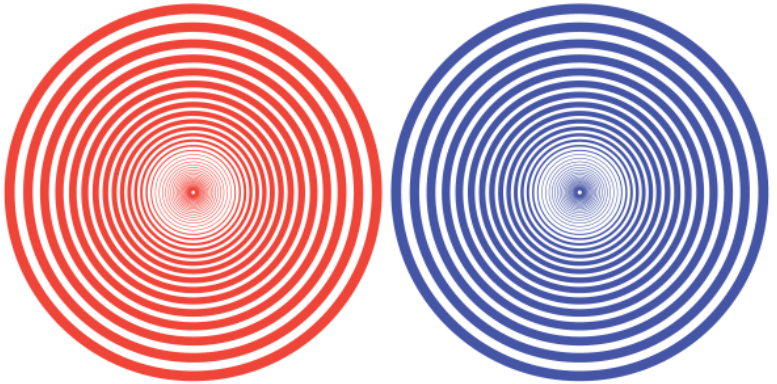
More importantly, pedestrians constituted 40% of the total road accident fatalities, while occupants of vehicles made up 31% and operators accounted for 29%.

Pedestrians are highly at risk of road accidents in Monrovia compared to other parts of the country.

OBJECTIVE OF THE RESEARCH

Understand the behavior of pedestrians and drivers at these selected intersections

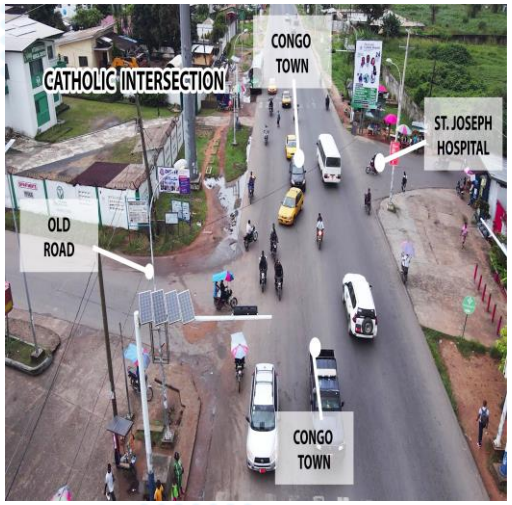
Access the road infrastructure to determine the various hazards and the risks the posed pedestrian.



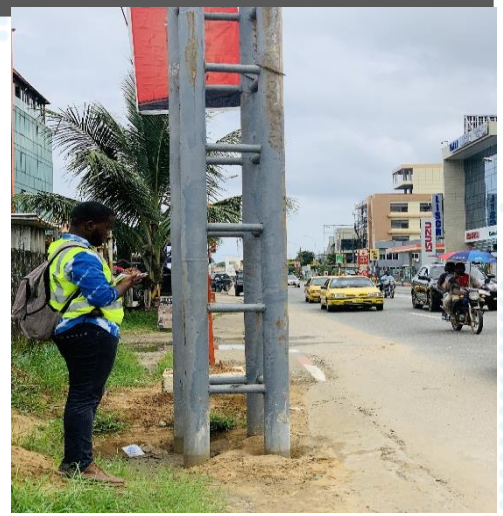
Identify patterns from the UAVs and the infrastructure assessment that can be used to develop road safety interventions and policies for pedestrians' safety on TB.

Study Methodology

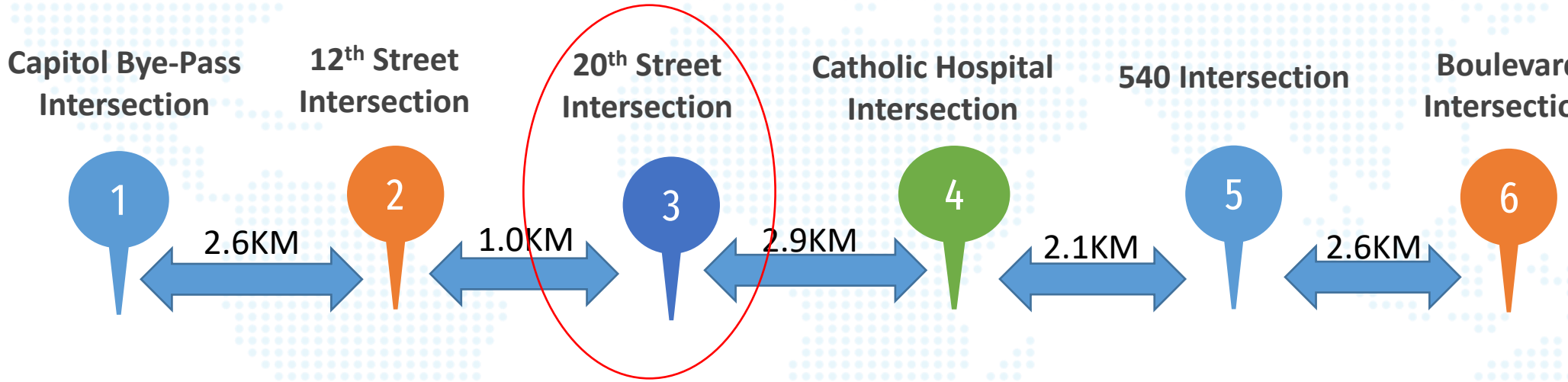
UAV survey at the selected intersections



Physical Infrastructure Assessment for Pedestrians Safety



Intersections



Data Collection – UAV Survey at Unsignalized

- Drivers' behavior at Unsignalized intersections
- Pedestrian behavior at unsignalized intersections

Data Collection - UAV Survey at Signalized Intersection

- Drivers' behavior at signalized intersections
- Pedestrian behavior at signalized intersection

Data Collection (Pedestrians Risk Assessment)

- Streetlights on the side walks
- Open stormwater and sewer drain (OSSD) on the sidewalk
- Limited pedestrians crossing facility
- Vendor occupy sidewalks
- Dumping of waste on sidewalk
- No Sidewalk
- Other hazard

Data Analysis (Pedestrians Risk Assessment Cont.) Likelihood of each Hazard

Very unlikely	Unlikely	Possible	Very likely
1	2	3	4
It will take a long time for accidents from this hazard to occur.	There's a good chance for accidents from this hazard to occur	There's a good chance for accidents from this hazard to occur.	There is a clear chance that the hazard will occur at some point in time.

Data Analysis (Pedestrians Risk Assessment Cont.) Severity Rating of each Hazard

Minor

- **The severity of the hazard will not lead to injury or short-term disability.**

Serious

- **The severity of the hazard will lead to short-term injury or disability**

Major

- **The severity of the hazard will be significant and lead to long-term injury or disability**

Fatal

- **The severity of the hazard will lead to fatality.**

Data Analysis (Pedestrians Risk Assessment)

Identification of the pedestrian hazard on the road

Assess the likelihood of it occurrence

Determine the severity of the injury that maybe sustained

Calculate the risk impact of each hazard

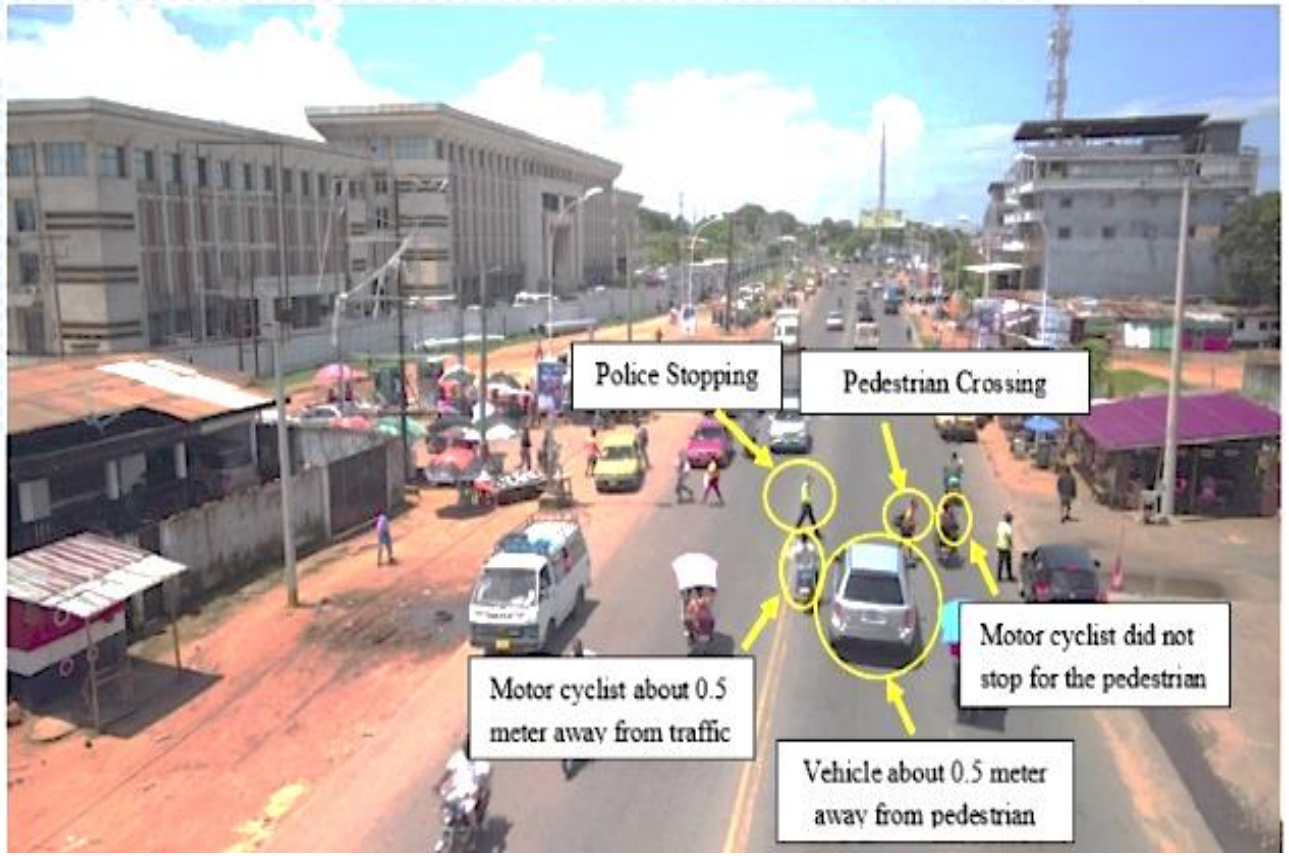
Risk impact of the Hazard = Severity rating of the hazard x Likelihood rating of the hazard happening.

$$RI = Sxl \quad \text{.....1}$$

OBSERVATION FROM THE UAVs SURVEY

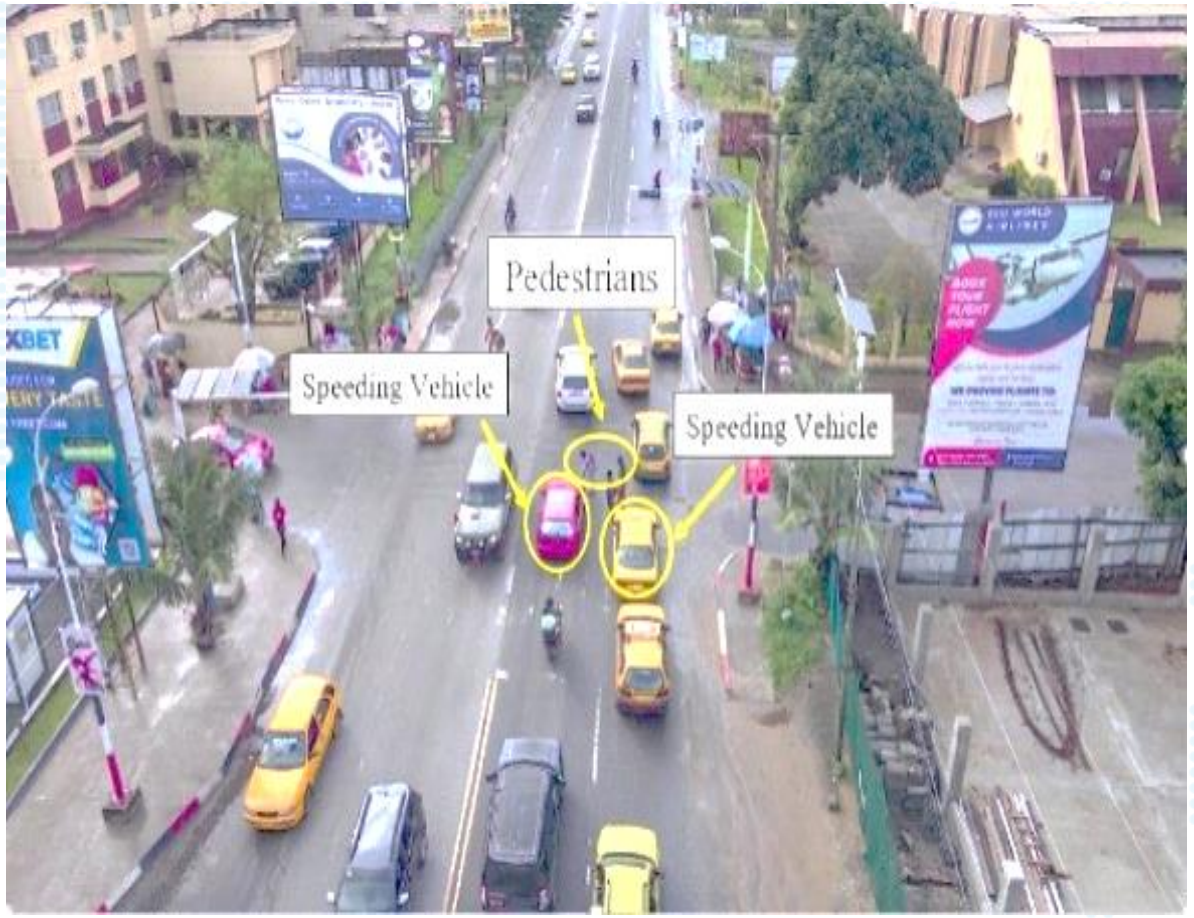
Pedestrain and Vehicle interaction

– Persistent violation of traffic laws by drivers



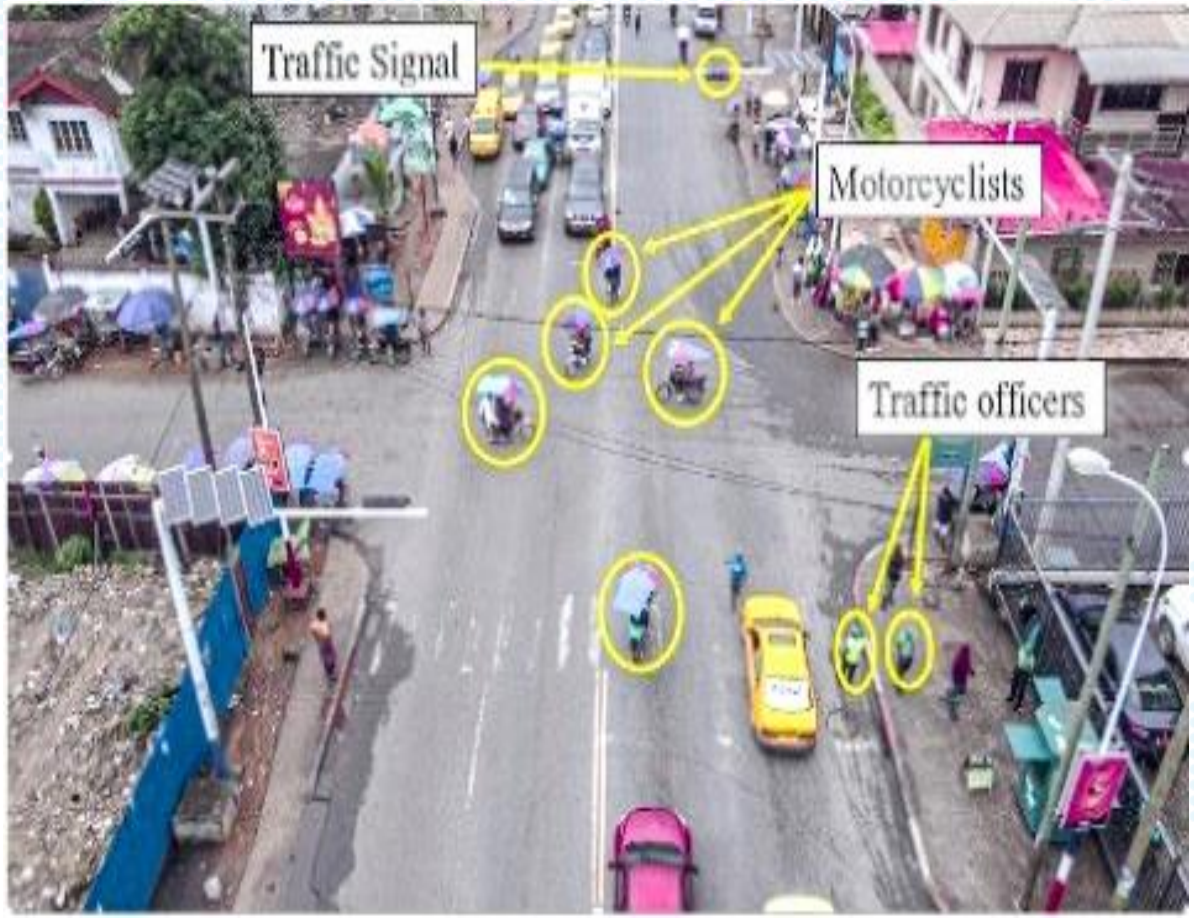
OBSERVATION FROM THE UAVs SURVEY

Speed limit violation at the selected intersection



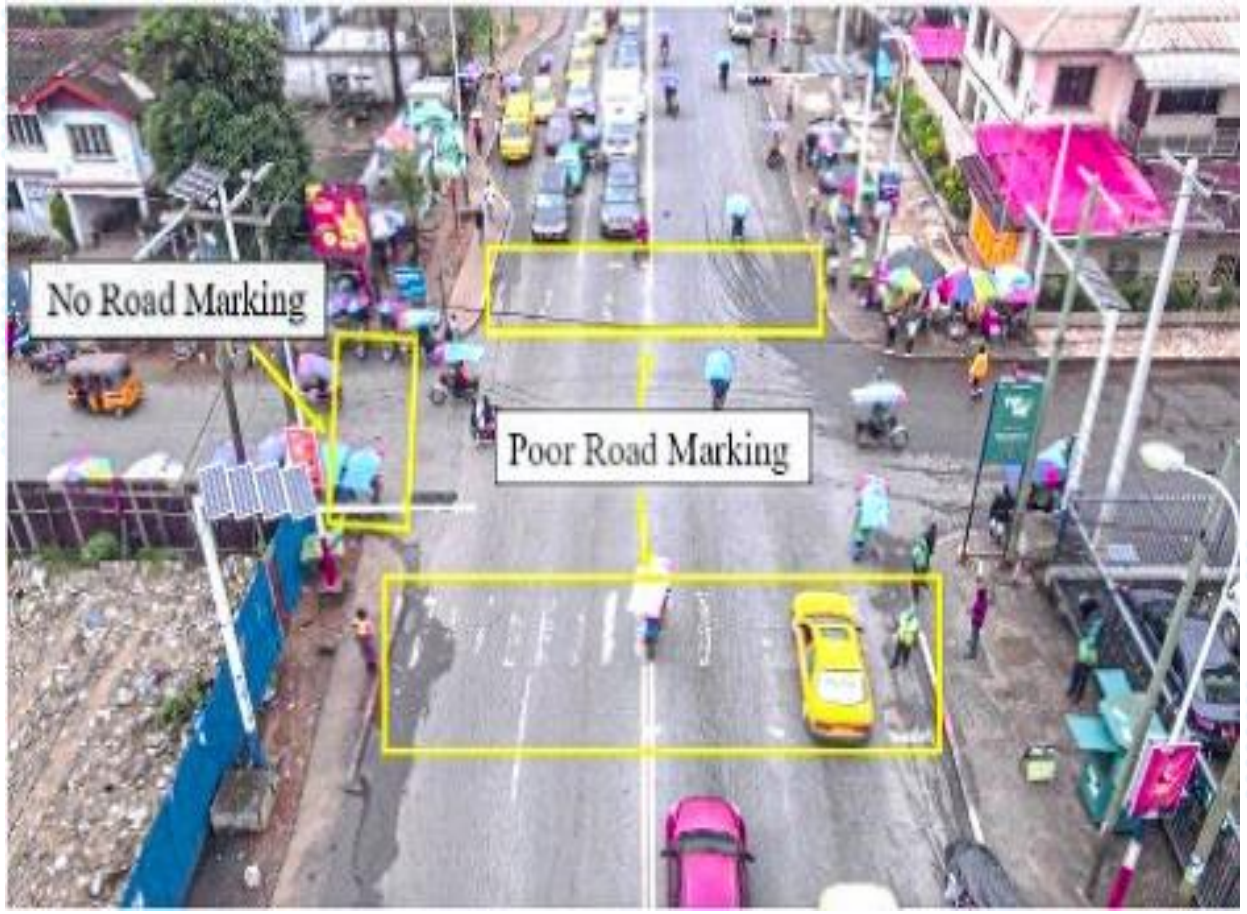
OBSERVATION FROM THE UAVs SURVEY

Inadequate and poor regulation at the selected intersection



OBSERVATION FROM THE UAVs SURVEY

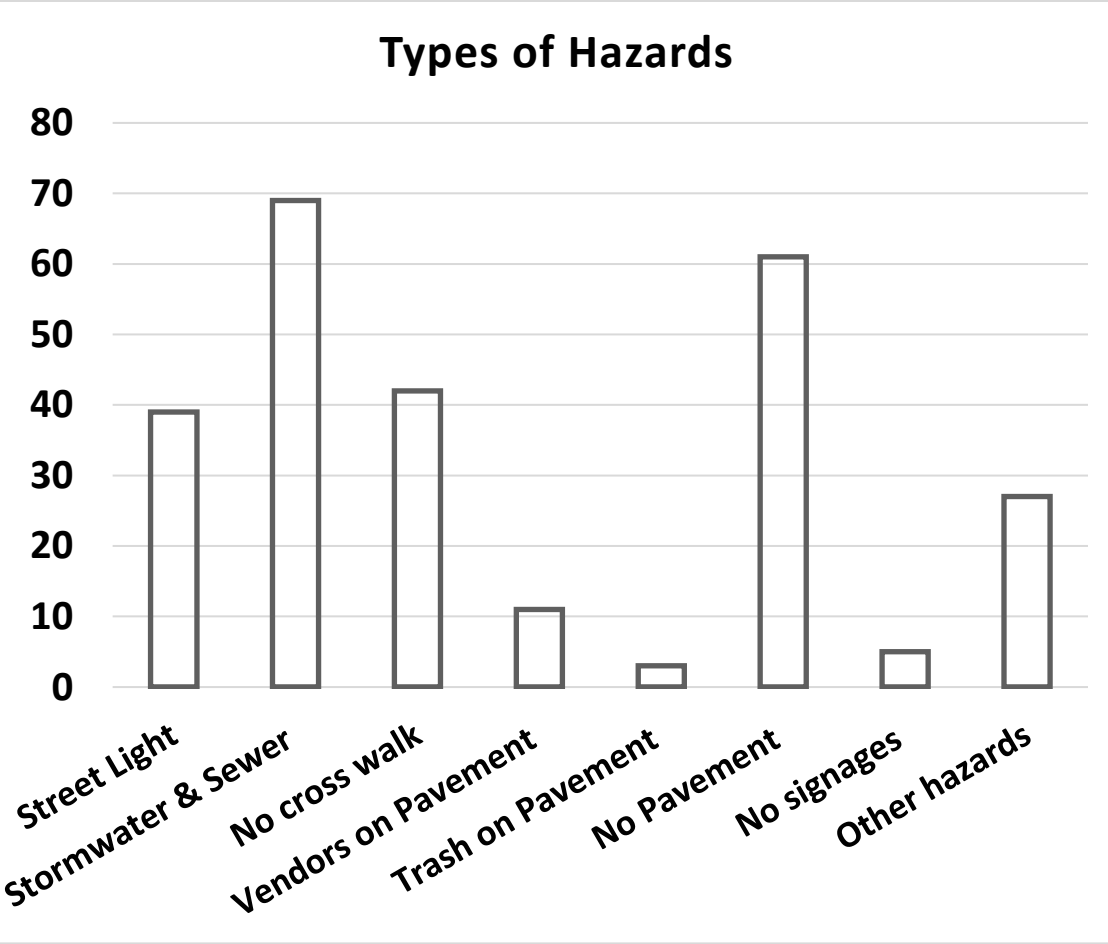
Poor Road markings



Research Finding (Pedestrians Risk Assessment)

- Open Stormwater and Sewer Line amount for the highest hazards found with the total of 69 hazards

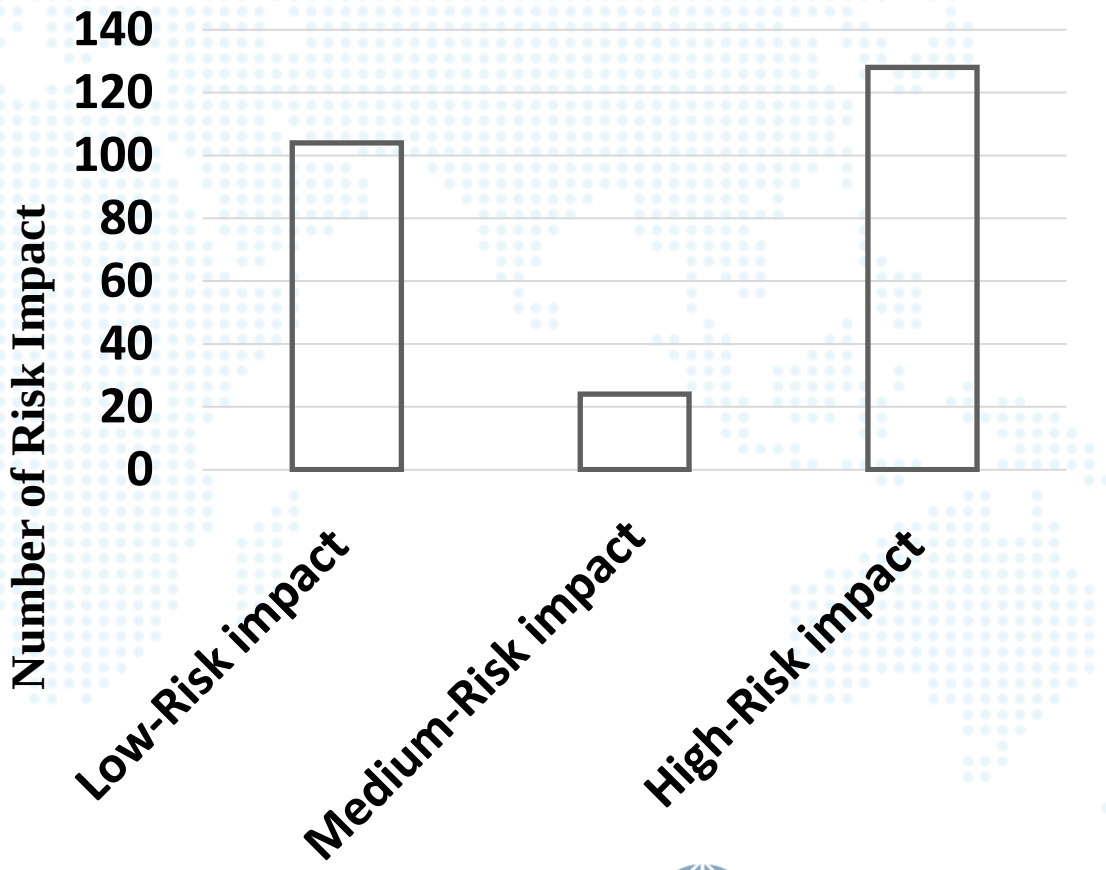
- The absence of paved sidewalks for pedestrians accounted as the second highest hazards for pedestrians



Research Finding (Pedestrians Risk Impact Analysis)

- 128 of the number hazards found alone the Tubman Boulevard have High Risk Impact

- The total number of low-risk impacts calculated on TB is 104 of the total number of hazards found.



Risk Metrix Analysis – Pedestrian Risk Analysis

Likelihood				
(4) Very likely	4	8	12	16
(3) Possible	3	6	9	12
(2) Unlikely	2	4	6	8
(1) Very Unlikely	1	2	3	4
	(1) Minor	(2) Serious	(3) Major	(4) Fetal

Severity

CONCLUSION

The research conducted revealed several critical findings that require urgent attention and action to improve pedestrians' safety:

- **The study found a total of 256 hazards along the 11.2 km corridor which is alarming.**
- **Open Stormwater and Sewer Lines and the lack of pedestrian sidewalks were consistently highlighted as major hazards in multiple sections along the corridor.**
- **The constant violation of traffic regulations by drivers, particularly speeding toward pedestrians on crosswalks poses a significant danger to pedestrians.**
- **The absence of law enforcement during both day and night encourages drivers to drive recklessly and compromises pedestrian safety.**
- **poor road markings and inadequate lighting further exacerbate the risks faced by pedestrians using the TB.**

Recommendations

The findings in this research shows that road safety is a challenging issue on the TB. However, the adaptation of the safety system approach can help put the TB:

A call for immediate action to mitigate identified hazards like the repairing of potholes on the sidewalks, construction of sidewalks.

Regular markings of the street to clearly show the pedestrians crossing, and other designated locations for pedestrians.

The implementation of proper traffic clamming measures to reduce speed because speed have been identified as one of the major hazards at every unsignalized intersection

The increase in law enforcement presence especially at these unsignalized intersections to deter reckless driving behavior during day and nighttime

Thanks for your attention
Any Questions?

Acknowledgement to Road Safety Action International Team and Particularly to Emmanuel Jallah

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