Analysis of pedestrian walking speeds on an urban walkway: A case study

Eric Nyame-Baafi [1], Charles Anum Adams [2]

[1] Urban Roads Department, Ejisu Municipal Assembly
[2] Civil Engineering Department, KNUST

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KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

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Introduction

- Walking speeds are used to **calibrate** microscopic pedestrian simulation models such as **PTV VISWALK**.

- They are also important in the design of **pedestrian facilities** and **public transport timetables**.

- Walking speeds among pedestrians were **locally unavailable**, **hence the need for the study.**

- **Adopted standards** or **arbitrary values** used in design may not reflect local pedestrian walking behaviour.

Research Questions

- What are the walking speeds among pedestrians on a walkway?
- What is the mean walking speed of pedestrians surveyed?
- How does this result compare with other studies?
- What is the implication for planning and design of pedestrian facilities?

Methodology

- A **suitable case study** walkway located at **KNUST Junction, Kumasi** was selected.
- **A trap** of length **(6m)** was marked on the walkway using self-adhesive tape to measure pedestrian speeds.
- A **video camera** placed at an elevated position was used to record pedestrians during a typical **weekday morning**.

Methodology

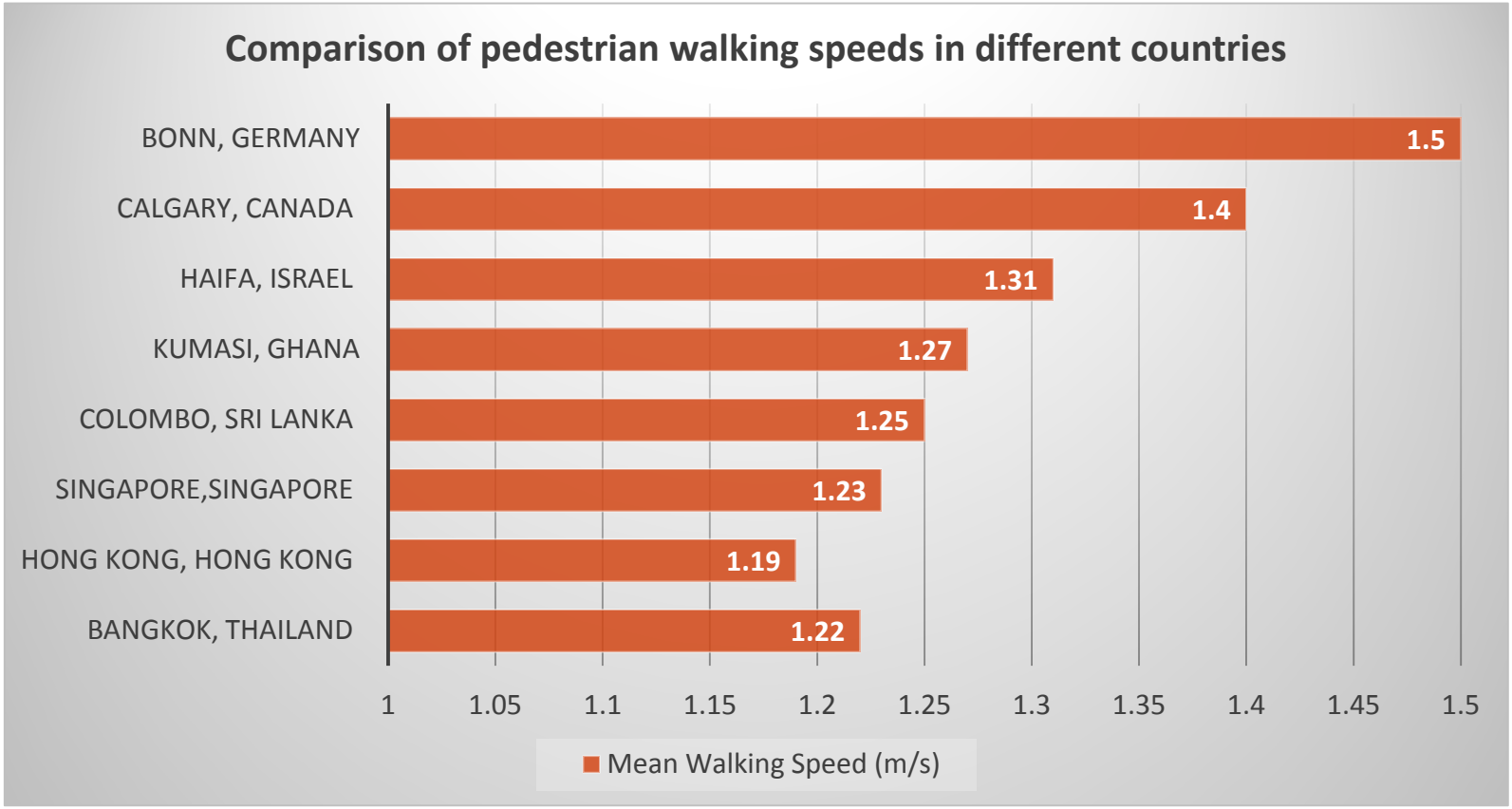
- The required pedestrian data were later extracted from the recorded video.
- Randomly selected pedestrian movements were **tracked and timed** over the marked-off length with a **stop watch**.
- A total of **2,618 pedestrians (mixed urban)** were surveyed.
- The walking speed **(m/s)** was derived by dividing the known length of section by the walking time.
- For analysis purposes, pedestrians were subjectively grouped into **3** categories:

Pedestrian Categories	Description
Young Pedestrians	Those who appeared to be less than 18 years
Adult Pedestrians	Those who appeared to be between 18 – 60 years
Elderly Pedestrians	Those who appeared to be more than 60 years

Results

Pedestrian walking speeds				
Age groups	Sample Size	Average walking speed (m/s)		
		Male	Female	Both
Young (<18 yrs.)	577	1.34	1.29	**1.32**
Adult (18-60 yrs.)	1921	1.34	1.19	1.28
Elderly (>60 yrs.)	120	1.11	0.98	1.05

Results


Comparison of pedestrian walking speeds in different countries
BONN, GERMANY
CALGARY, CANADA
HAIFA, ISRAEL
KUMASI, GHANA
COLOMBO, SRI LANKA
SINGAPORE,SINGAPORE
HONG KONG, HONG KONG
BANGKOK, THAILAND
1.5
1.4
1.31
1.27
1.25
1.23
1.19
1.22
1
1.05
1.1
1.15
1.2
1.25
1.3
1.35
1.4
1.45
1.5
Mean Walking Speed (m/s)

Conclusions

- The walking speeds among pedestrians in Kumasi, Ghana have been determined.
- The overall mean walking speed of pedestrians surveyed was found to be **1.27 m/s**.
- This is faster than the mean derived from studies in **Asia** but slower than values obtained in **Germany** and **Canada**.
- This study confirmed the need to design pedestrian facilities based on local standards.

Future Research

- More research is needed on this topic to derive suitable local design standards.

- Similar studies should be conducted for other pedestrian facilities such as **crosswalks, stairways** etc.

- Future research should consider the use of **Artificial Intelligence (AI)** for faster pedestrian data processing.

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For further enquiries, contact:
Email: nyamebaafieric@yahoo.com
Phone : +233 545348814

THANK YOU