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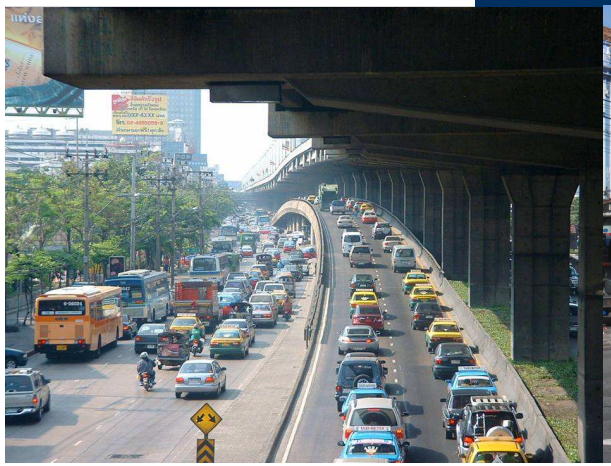

Seminar Paper

Trolleybus Rapid Transit Systems in Developing Countries

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Content

1. Introduction

Actual Situation in Developing Countries

"State of development differentiates from country to country and equally on the local level"

Areas of Problems:

- Economics
- Politics
- Socio-Culture
- Health
- Education
- Transport

1. Introduction

Actual Situation of public transport in many developing cities:

- Badly managed, low service quality, informal modes
- Competition IN the market rather than FOR the market
- Long travel times
- No integration
- Unreliable services; poor quality

High need for a rational, high quality and financially viable alternative

1. Introduction

Why Trolleybus Rapid Transit in Developing Countries?

Strength of Trolleybuses

Strength of BRT

TRT
- Time-efficient
- Space-efficient
- Energy-efficient
- Local emission freeness
- In theory, suitable for operation in developing cities

Developing Countries
- Traditional traffic system is the bus
- Demand on cost-efficient and sustainable solutions

Requirements on Trolleybus Rapid Transit

Technical Requirements

- Electrical and mechanical resistance of substations, trolley system, buses and stops
- Stops, buses and trolley system need to ensure easy boarding and alighting

Operational requirements

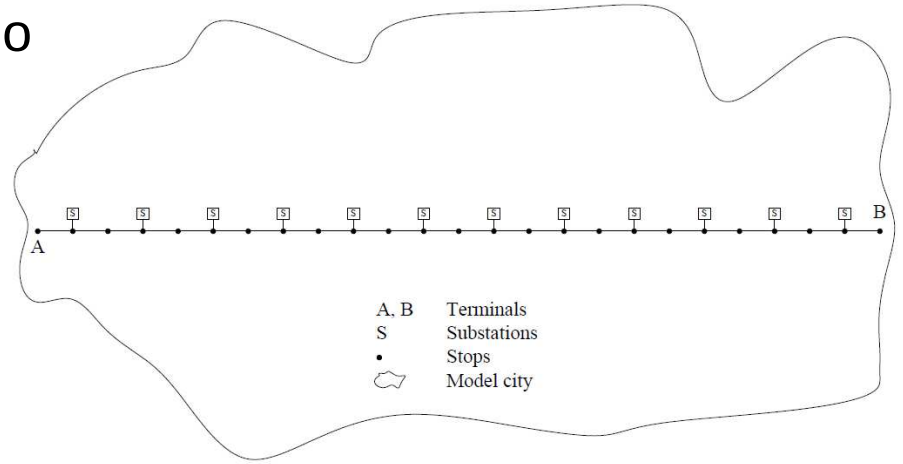
- Corridor identification
- Feeder services
- Service options
- Passenger Capacity
- System Management Control

Technical Feasibility – Model Scenario

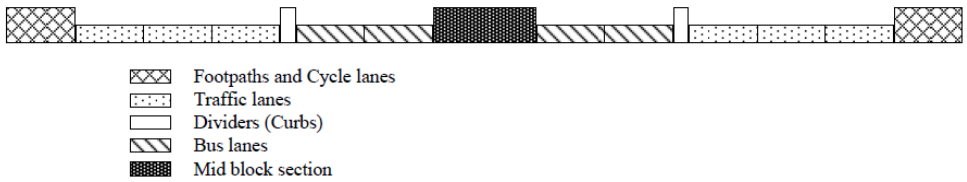
Starting Point:
BRT Bogota where the passenger capacity is 42,000 Pass/hour and direction and the service frequency is 15sec.

Most important issues:
- Boarding and alighting Process
- Electrical Feasibility

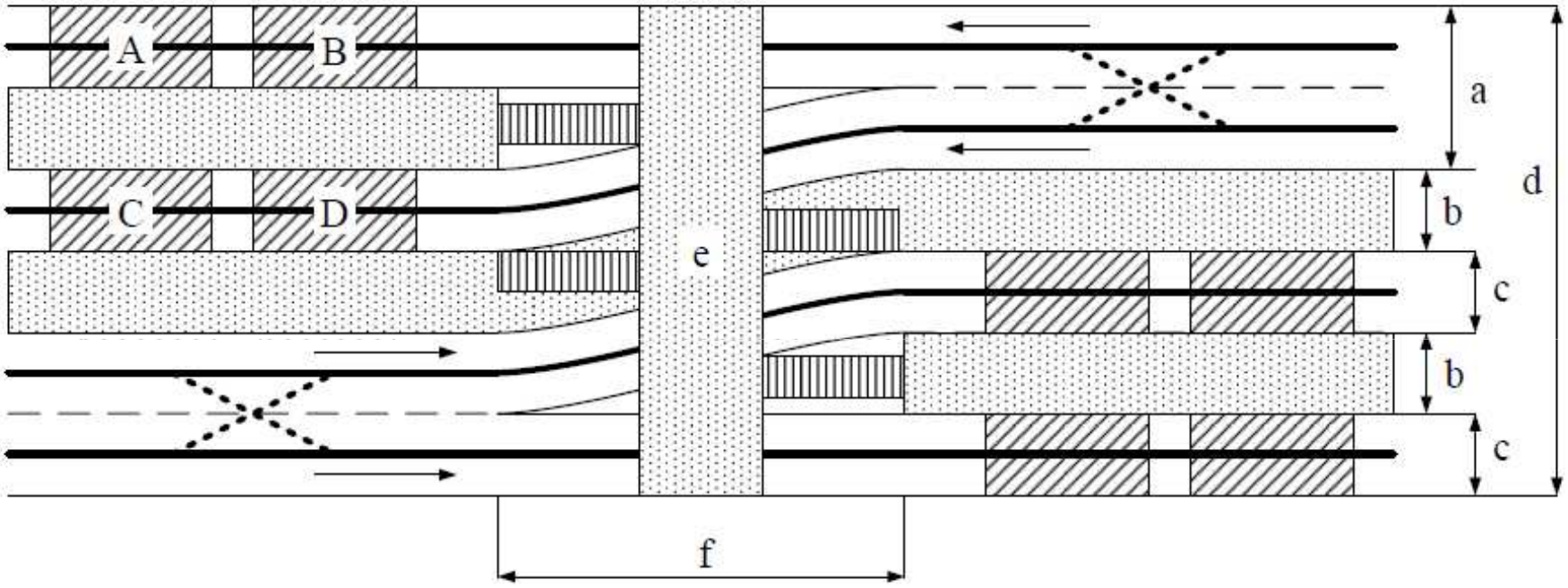
Assessment of Stop Design and Electrical Dimensioning



Boundary conditions:
- AB: 12km (maximum passenger capacity)
- Distance between substations: 1km
- Bilateral feeding
- Feed voltage:750V
- Each stop is designed in the same way
- Width of bus corridor (stops): 19m



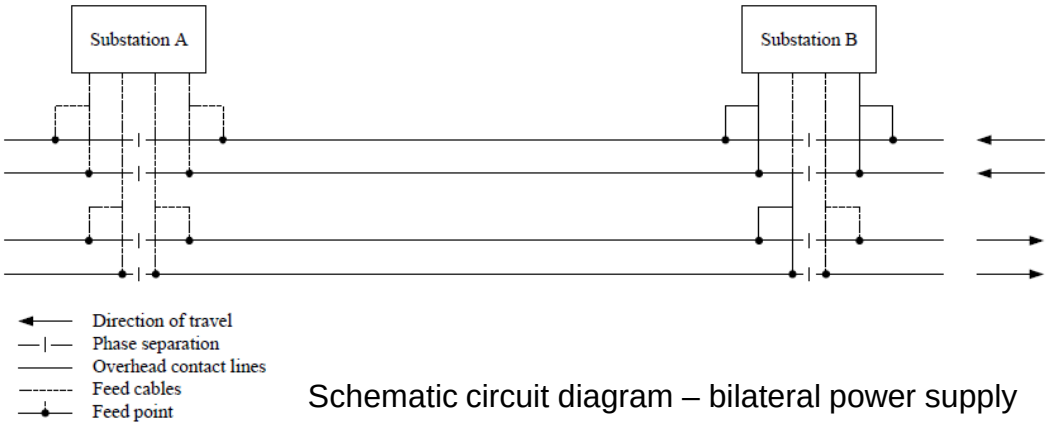
Technical Feasibility – Design of Stops



Catenary system	
Additional switches	
Direction of travel	
Bus track markings	
Stopping bays	
Platforms	

A...D	Buses
a	Width of tracks (7m)
b	Width of platforms (3m)
c	Width of bays (3.5m)
d	Total width (20m)
e	Foot brigde
f	Area to check

Technical Feasibility – Electrical Dimensioning

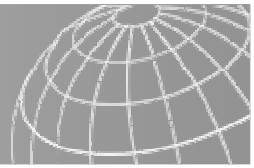


Schematic circuit diagram – bilateral power supply

Assumption:
- Rolling friction of buses is higher than for trams
- Weight of trams is higher than for buses
- Hence the energy demand and the calculations are identical

Results:
- Voltage drops enables distances between substations (dbs) up to 1.3km
- Current carrying capability: dbs = 700m
- Short circuit capability: dbs = 450m

4. Benefits and Costs



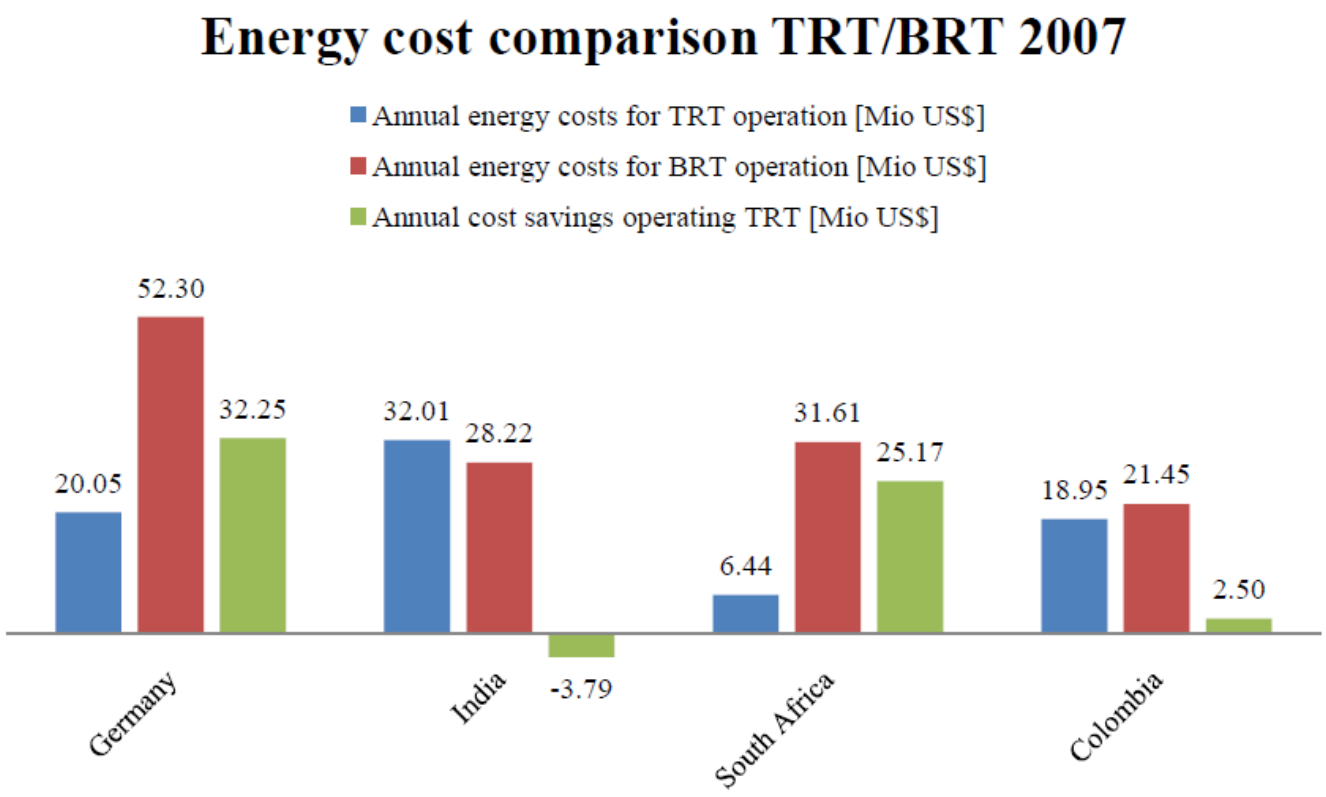
Benefits:

- Time-efficient
- Space-efficient
- Energy-efficient
- Local emission freeness
- Low noise emission
- Improvements in a City's Public Transport
- Contribution towards sustainable city development

Costs:

- Higher energy demand than conventional trolleybuses
- Higher investment cost than conventional trolleybus systems and BRT

Suitability of TRT for Developing Countries



In terms of sustainable transport and city development TRT is suitable for operation in developing countries.

The problem are the costs and the requirement of a reliable energy supply

5. Results

Conclusion

Results based on a simplified model scenario and calculations conducted are usually used for trams.
Lack of experience for TRT operation with the aforementioned passenger capacities

Recommendations:
Electrical Simulation of an existing BRT to enable an real assessment of electrical feasibility and to conduct a considerable cost comparison between BRT and TRT.
Research on DC drives to check whether they may be suitable for TRT operation due to less complex technologies and the saving of power electronics

It should be also proved if TRT can be implemented in transition countries where the public grid is more reliable than in developing countries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