A SPACE OF FLOWS

KEJETIA LORRY STATION

The project of 120 columns and 120 trees

Graduation project Simon Scheepens
“Kumasi Central Market largest market in West Africa”
Kumasi Metropolitan Assembly
“It’s the Ashanti capital of West Africa”

Founded as the ritual and commercial center of the Ashanti kingdom, Kumasi is one of the few pre-colonial urban settlements in West Africa.

Ashanti king
"Cities are organized primarily around flows that are the main reason why they exist: Cities are places of exchange where people, service, and goods are collected and distributed in a multitude of flows."

Zettl: 2007
“City center is reaching a deadlock”

“Traffic congestion, due principally to growing of the city, is becoming a serious problem in most towns and cities, restricting economic activity, detracting from the quality of life generally, and resulting in pollution which is damaging to both health and the environment.” Richard Iles, 2005
Flow of people

Explosion of the city

Flow’s stagnate

City center is reaching a deadlock
KEJETIA LORRY STATION

current symbol for stagnation
Main purpose bus station is serving market.
Only inner city person traffic
Intra-city mass transport other location (🚗)
Goods transport near market (⚫)
“Engaged in commercial or social activity, urban actors create multifaceted networks that are in constant interaction with each other – with the object of trade or consumption – and with the city’s physical structure.” Müller, 2009
Visiting
- Eating
- Ticket buying (BRT)
- Departure (boarding)
- Arriving (getting off)
- Waiting
- Shopping
- Transfer
- Service

Traveling
- Hawker
- Vendor

Trade
- Taxi
- Tro.Tro

Pedestrian
- Traveler

Visiting
- Hawker
- Vendor

Travelling
- Hawker
- Vendor
70%  11%  10%  8%

Tro.Tro  Pedestrian  Private car  Taxi

“those on very low incomes will require [...] only a very basic standard of service”
Richard Iles, 2005
Para-transit
(‘informal’, ‘intermediate’, ‘unconventional’ public transport)

Easy to purchase, operate and maintain
The capital investment is low
A minibus requires relatively little special skills to drive
No special driving license

danfos (Nigeria), dolmus (Turkey), emergency taxi or ET (Zimbabwe), jeepney (Philippines), public light bus or PLB (Hong Kong), robot (Jamaica), silor (Thailand), tempo (Bangladesh), cent-cent (Republic Congo)
Quick respond to changes in demand

Greater number of route variations

Accelerate better

Takes less time to load

Is faster

Maneuverable in narrow and winding roads

Accelerate better

Is faster

Takes less time to load
“As cities grow, the appropriate mix of modes is likely to change: for a small town, a system based on small vehicles is normally most suitable, but this is not usually adequate for a larger town or city, which is likely to require a system using at least a proportion of larger vehicles.” Richard Iles, 2005
Fixed routes with exclusive rights of way

High number of passenger per bus

No congestion problems
<table>
<thead>
<tr>
<th>Feature</th>
<th>Tro.Tro</th>
<th>BRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusive rights of way</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>Fixed routes</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>Passenger per bus</td>
<td>14</td>
<td>75</td>
</tr>
<tr>
<td>No congestion problems</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>Acceleration, speed and time to load</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>Great number of route variations</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>Maneuverable</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>Changes in demand</td>
<td>✗</td>
<td></td>
</tr>
</tbody>
</table>
Intervention

Tuning between space and flows
Movement, Speed, Rhythm, Garden city
Urban traffic flows

People flows
To give movement meaning you need rhythm

\[ X = \text{Time needed to get to the next point} \]
Counterpoints as design tool
Round columns: a flowing sense of space
The Garden City Revival

Mahogany Dubini - *Khaya ivorensis*
Hardwood - native tree

Theobroma cacao also Cacao tree and cocoa tree, is a small (4–8 m or 15–26 ft tall) evergreen tree

In Ghana, the Neem tree was introduced by Sir Frederick Gordon Guggisberg (1869-1930). They call the tree there usually King, like the former name of the governor.

Lots of shade and medicinal tree

Cutting (forestry) for the industry.

The city’s major exports are cocoa and wood.
Water management
(as design tool)

Climate graph of Kumasi (dotted line represents the Netherlands),
SOURCE: http://www.climatetemp.info/Ghana/ & KNMI)
Premise 1 - Finishing ring
Premise 2 - Decentralize the market

Adding extra ring and Tro.Tro city system

1 Inner city
2 Outer city
3 Regional
Premise 3 - Introducing BRT

(project Michel Leunes)
Premise 4 – Reduction Tro-Tro’s

Regulation
Licenses
Union membership
Operational permit (quality of Tro.Tro)
Master plan city level

- Market
- Train station
- Station quarter
- Zoo
- CBD
Adding a bridge
FLOW

URBAN PEDESTRIAN ZONE CONNECTS
Pedestrian zone

A space for the citizen of Kumasi
Facilities, Rhythm, Garden city, Separate flow’s, Water management
Facilities

gives rhythm to the flows
Rhythm

Boundary and axis's

Bus station

Market
Garden city
Water management

Shopping – second gutter
Park - meandered stream - overload
Travel – mean gutter
Bridges + weatherboard + Ashanti monument
Boulevard Square

A space for unpredictable movement

Square, Place for hawkers, Transition space, Separate flow’s
Ramp (Asphalt)

Concrete strip

Pavement tiles
Improved subgrade
Sand filling

Sheet asphalt
Sense-graded mix of sand
Improved subgrade
Sand filling
KEJETIA LORRY STATION
new design

The complex of the flows solved
Clear organization, Spatial, Shelter, Separation of flows
Master plan bus station area
Adding a bridge to separate the flows and don’t obstruct the pedestrian flow

“Making walking safer, easier or pleasanter, through such measures as the provision of adequate footpaths, and shelters or shade along selected footpaths as well as at bus stops, will improve the quality of public transport and improve the quality of life for the majority of people.” Richard Iles, 2005
Traveller Flow
300,000 persons / day

Differences in height are solved with ramps
Entrée

The appearance of the bus station

Gateway, walk along, bridge as design tool, roof
Entrée is with supervision from the police and the bus station manager.
Canopy
Heart

Welkom to the Kejetia Lorry Station
Clear organization, Spatial, Shelter, place to be
Light:
Stainless steel screen
620 x 500 mm

Wooden boarding is 50 x 500 x 5000 mm

Wooden column is 100 x 200 x 4650 mm

All wood is hardwood:
Mahogany Dubini

Guard rail:
Wooden beam 250x150

Column for lights:
Fixed on reinforcement concrete of bridge (8mm)

Wooden column reinforced with tapped metal plate

Column kept 10mm from bridge

Bridge:
reinforced concre,, poured on side

Asphalt

OUTSIDE
BRT Flow

Flows of 100 buses per hour are typical*
\[ \Rightarrow 90,000 \text{ persons / day} \]

Tro.Tro Flow

Arrival and departure are separated

2,5 minibuses per 1000 people*
210,000 persons / day = 525 Tro.Tro’s (instead of 750)

*Iles, Richard. *Public Transport in Developing Countries*, Elsevier, 2005
“[...] when they are not required for loading, buses should be parked elsewhere, preferably at depots where there are facilities for vehicle servicing and cleaning.” Richard Iles, 2005

Especially at off-peak times if there is a significant difference between peak an off-peak service levels
Passerelles

The travelers flow visible in space
Passerelles moves through column forest
Sheet asphalt 50 mm
Wooden flooring 23 mm
Walings and bearing 100 x 300 mm

Railing:
Column 50 x 100 mm

All wood is hardwood:
Mahogany Dubini

Column:
reinforced concrete, poured on side
BRT Island and Tro.Tro platforms

BRT Island

Tor.Tro Arrival
Tro.Tro departure
The connection with the Central Business District
Project offers
The organization of city center and the bridge results in public space and a bus station
Opportunity for the city

Terminal points

“An efficient urban bus route network in any city of medium size or large will inevitably require a large number of terminal points [...]” Richard Iles, 2005

Kejetia Lorry Station is opportunity for the rest of the city:

- Typical organization: Flows divided, Pedestrian key user, Tro.Tro depo
- Unique combination of Tro.Tro and BRT
- Shelter
- Possibility to turn
- Car parking garage
recommendation for further research

Situated near satellite markets
A SPACE OF FLOWS
KEJETIA LORRY STATION

Questions?

The project of 120 columns and 120 trees

Graduation project Simon Scheepens