Leadrail’s mission is to make transport “Safer, Swifter & Better”

Presently several advanced, innovative and sophisticated technologies and solutions are available in Urban Transport Domain and at the same time traffic gridlocks are common in several cities, especially India. Thus there is a need to introspect and develop a solution which addresses the gap.

The Bie-Bus solution is a more of system development and is basically developed keeping Indian City conditions in view but can be altered to suit local conditions in other countries.
**Value Engineering of Urban Transport Systems**

VALUE is the reliable performance that a product or process must do to make it work and satisfy – at the reasonable cost.

FUNCTION is sometimes referred to as Performance, it is all those things which the product, or process must do to make it work and satisfy.

COST is the expenditure of a resource, which may include time, money, people, energy and material.
Mass Rapid Transit Systems are Metro rails, Mono rails, LRTs & BRTS (PRTs, APMs are not considered as MRTS)

**Metro rails**
- Capital Cost per km: $40-70mn
- Capacity: 40000-60000 pphpd
- High Cost & Less network density
- Proven system and High density corridors

**Mono Rails**
- Capital Cost per km: $20-30mn
- Capacity: 10000-15000 pphpd
- Safety Evacuation concerns
- High unit (passenger-km) cost
Present Urban Transport Solutions

- **Bus Rapid Transit System**
  - Capital Cost: $4-5mn
  - Non availability of ROW
  - Lane Enforcement issue
  - Single Lane Capacity: 3000-5000 pphpd

- **Light Rail Transit**
  - Smooth Curves
  - Smooth Grades
  - Land Acquisition

- Need for novel solution: Safe, Affordable

- **Bie-Bus: Bi-level Elevated Bus**
Novel Urban Transport: Bie Bus GAD
Urban Transport Solution: Bie Bus

- Elevated system on Roads
- Passes through the medians of cities
- Stations around 600 m interval
- Bi-level box superstructure
- Articulated Buses plying at two levels
  - Top Level – “TO” Direction
  - Bottom Level – “FROM” Direction
- Lateral maneuvering:
  - Mechanical Leads
  - Magnetic Deviation
- On Board Route Switching Mechanism
Bi-Level Advantages:
1. Box-Optimum civil cost
2. Easy access & Both sides PFs
3. Less Station Dwell time
4. Less station energy cost
5. No requirement of sophisticated signals
6. Safe Branching & Merging of routes
Capital Cost: $10-12 Million per km
Capacity: 15000-18000 pphpd
Operational speeds of 30-32 kmph
Guided and Signal free. Self enforcing
Robust technology and less control systems
Pre-cast CWs & Quick Project Delivery (18 months)
Less land acquisition (1.5 m of road median space)
Sharp curves (40-45 m) & Steep Grades (10%)
Wider coverage -> through narrow city roads
Urban Transport Solution: Bie Bus

- Platform level boarding and level floor (650 mm)
- Both side Doors and Platforms
- Less station dwell time (12 secs)
- Highest safety features
  - Redundancy Systems,
  - Anti Rear Collision Sensors
- Pre-ticketing and even smart cards
- Real time information to passengers
- Less noise pollution and vibration problems
- Environment friendly buses like Hybrid or Electric vehicles (Option of overhead charging at stations)
Bie-Bus: Aesthetics

Aesthetic & sleek configuration
Non-intimidating structures
No Catenary along the viaduct
ORCR in station: Fast recharge

Top level Bus leaves the station & Bottom level Bus enters in opposite direction
Bie-Bus: Station Configuration

ELEVATION @ STATION LOCATION

SECTION AT STATION LOCATION
Bie-Bus: Bi-Level Viaduct

SECTION AT VIADUCT LOCATION

ELEVATION @ VIADUCT LOCATION
Bie-Bus: Station Section
Bie-Bus: Lead-Wheel Interface Options

LEAD - WHEEL INTERFACE ARRANGEMENT OPTIONS

INSIDE LEAD OPTION

MID LEAD OPTION

OUTSIDE LEAD OPTION
Bie-Bus: Typical Mechanical Lead

Typical Hollow Trapezoidal Lead of 100 x 150 x 200 mm
Bie-Bus: Lead-Wheel Maneuvering

LEAD WHEEL ARRANGEMENT

- Switch Wheel Position In Idle Mode
- Switch Wheel In Action
- Switch Lead
- Lead Wheel
- Tubeless Tyre
- Tyre Contact

LEAD
Bie-Bus: Switch Wheel in Action

SECTIONAL ELEVATION OF LEAD-WHEEL ARRANGEMENT

SWITCH WHEEL POSITION IN IDLE MODE

TUBELESS TYRE

MAIN WHEEL

LEAD WHEEL FRAME

LEAD WHEEL

LEAD

SWITCH WHEEL IN ACTION

SWITCH LEAD
Bie-Bus : Switching Mechanism

CONVERGENCE / DIVERGENCE MECHANISM
Bie-Bus: Level Interchange Operation

TERMINAL STATION WITH BI-DIRECTIONAL BUS
Bie-Bus: Level Interchange Operation

GENERAL ARRANGEMENT OF TERMINAL STATION WITH UNI-DIRECTIONAL BUS
Bie-Bus: Concentric Articulation
Bie-Bus: Typical Floor Plan & Elevation

LEAD BUS

PLAN

ELEVATION
Life Cycle Costs: Regular Systems Vs Bie-Bus

- Capital cost Per person per km (INR)
- O&M cost per person per km (INR)
- LC Cost per person per km (INR)

<table>
<thead>
<tr>
<th>Unit</th>
<th>Metro Rail</th>
<th>Mono Rail</th>
<th>Light Rail</th>
<th>BRTS</th>
<th>Bie-Bus</th>
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</thead>
<tbody>
<tr>
<td>Capital</td>
<td>0.50</td>
<td>1.00</td>
<td>2.50</td>
<td>2.00</td>
<td>1.50</td>
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<tr>
<td>O&amp;M</td>
<td>0.25</td>
<td>0.50</td>
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<tr>
<td>LC Cost</td>
<td>0.75</td>
<td>1.50</td>
<td>3.00</td>
<td>2.25</td>
<td>1.75</td>
</tr>
</tbody>
</table>
Life Cycle Costs: Regular Systems Vs Bie-Bus

Capital cost per km (x10 mn INR)

- Metro Rail
- Mono Rail
- Light Rail
- BRTS
- Bie-Bus
Bie-Bus: Attractions

- Latest technology & Future Transport
- Faster Project Implementation
- System Scalable & Adoptable
- System Scores high in RAMS
- Optimum Life Cycle Cost
- Feeder solution to Metro rail Corridors
- Safe & Cost-effective alternative to Mono Rails
- Congested City corridors with 15000 pphpd
- Optimum Mix of CAPEX-OPEX
- Best Suitable for PPP model
Bie-Bus

Thank you!

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