EVALUATION OF THE PERFORMANCE
OF URBAN PUBLIC TRANSPORT CONNECTIVITY

BACKGROUND OF THE CONNECTIVITY ISSUES
IN BUCHAREST PUBLIC TRANSPORT MAIN STOPS

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Bucharest city

Capital city of Romania
Urban area: 228 km²
Population: 1,883,425
Demographic density: 8,260/km²
Urban public transport system

• Existing public transport network:
  – 147 surface public transport lines – 370 km of network
  – 4 underground public transport (metro) lines – 62.25 km of network

• Existing transport demand: around 3.8 million trips/day, from which around 2.2 million public transport trips/day

• The average metro transport demand is around 20% of the entire public transport demand
New connection stop in the public transport system - Design

Existing metro network
New connection stop in the public transport system - Design

New Metro Line – M5
Future Metro Network

New connection stop in the public transport system - Design

Future Metro Network

Existing metro network

2016
2020
2030
2040
Eroilor public transport node scheme

Existing stop points and metro accesses

- 5 bus stops
- 4 access to the underground transport
Eroilor public transport node scheme

New metro configuration

-3 new access to the under ground transport
Pedestrian routes in the new metro station

The **first route (1)** – between the platform and ends at the gate line of the access.

The **second route (2)** – between the platform and the old station.
2 subroutes – one for transfer and 1 for exit/entrance.
Pedestrian routes in the passageway between metro stations

Subroute 2’ – leads to the transfer corridor to the existing Eroilor station areas

Subroute 2” – leads to the other directly to the new designed access of the new station
Capacity assessment methodology

- **Main design elements:**
  - Platforms
  - Escalators
  - Stairs
  - Passageways/corridors
  - Gate lines

<table>
<thead>
<tr>
<th>Level of service</th>
<th>Description (for queuing areas, walkways and stairways)</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Free circulation.</td>
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<tr>
<td>B</td>
<td>Uni-directional flows and free circulation. Reverse and cross-flows with only minor conflicts.</td>
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<tr>
<td>C</td>
<td>Slightly restricted circulation due to difficulty in passing others. Reverse and cross-flows with difficulty.</td>
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<td>D</td>
<td>Restricted circulation for most pedestrians. Significant difficulty for reverse and cross-flows.</td>
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<td>E</td>
<td>Restricted circulation for all pedestrians. Intermittent stoppages and serious difficulties for reverse and cross-flows.</td>
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<td>F</td>
<td>Complete breakdown in traffic flow with many stoppages.</td>
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- **Unit capacity for each design element:**
  - 0.5 sq m/person for platform (LOS D)
  - 100 passengers/min for escalators
  - 28 passengers/min/meter width (LOS C) for the two-way stairways
  - 40 passengers/min/meter width (LOS C) for the two-way passageway
  - 25 passengers/min/gate for the gate line
### Pedestrian movement evaluation

#### Passengers flows between station elements

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<th>From</th>
<th>To</th>
<th>E1_Peron_Later_PE-M1</th>
<th>E1_Peron_Later_PE-M3</th>
<th>E1_Peron_Centr_PE-M1</th>
<th>E1_Peron_Centr_PE-M3</th>
<th>E2_Peron_PE</th>
<th>E2_Peron_W1</th>
<th>E2_Peron_W2</th>
<th>E2_Peron_W3</th>
<th>E2_Peron_W4</th>
<th>Teren_Acc_A_Start</th>
<th>Teren_Acc_C+D</th>
<th>Teren_Acc_B1</th>
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**Table values:**
- E1_Peron_Later_PE-M1: 1420
- E1_Peron_Later_PE-M3: 836
- E1_Peron_Later_W-M1: 65
- E1_Peron_Later_W-M3: 19
- E1_Peron_Centr_PE-M1: 802
- E1_Peron_Centr_PE-M3: 1012
- E1_Peron_Centr_W1: 12
- E1_Peron_Centr_W2: 10
- E1_Peron_Centr_W3: 6
- E1_Peron_Centr_W4: 12
- E2_Peron_PE: 2626
- E2_Peron_W1: 457
- E2_Peron_W2: 454
- E2_Peron_W3: 242
- E2_Peron_W4: 181
- Teren_Acc_A_Start: 147
- Teren_Acc_A_Stop: 71
- Teren_Acc_C+D: 736
- Teren_Acc_B1: 1031
- Teren_Acc_B2: 1031
Pedestrian movement evaluation

Train circulation and headway

Old Station Platforms

New Station Platform

Timetable
Pedestrian movement simulation

Eroilor metro stop pedestrian densities – transfer corridor

New Station Pedestrian Area

Old Station Platforms

Transfer Corridor
Pedestrian movement simulation

Eroilor metro stop pedestrian densities – existing platform (old station)

Old Station Platforms

New Station Platform
Conclusions

Capacity assessment and station simulation helped in:
• identifying the design issues and correct them in design phase
• providing safe spaces for passengers and free circulation in the transfer areas

Next step
• Designing a better connectivity with the surface transport
• Correlating the surface public transport to the underground public transport
THANK YOU
JE VOUS REMERCIÉ
TEŞEKKÜR EDERIM