



Amsterdam - The Netherlands 26-29 June 2022

Featuring the 6th Urban Street Symposium

Urban Street Network Upgrade for the New Intercity Bus Terminal in the City of Athens

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Introduction

- Transportation multimodality projects

 can lead to an overall upgrade of an area and its surroundings
 - can have a significant social, economic and environmental impact
- Scope of the presentation is to case study the design of the new Athens intercity bus terminal combined with urban regeneration and urban street network upgrade.

Existing Conditions (1/3)

- Greek cities connected mostly with intercity buses
- > In Athens there are two intercity bus terminals
- Terminal 1 "Kifisos": serving the highest passenger demand, not accessible with public transportation, most passengers arriving by car or taxi
- Terminal 2 "Liosion": lower demand, located 700m from a train station
- Stations for buses towards international destinations scattered in several locations of Athens
- No space exclusively used for parking (park & ride, kiss & ride facilities)
- Heavy traffic and congestion around the stations

Existing Conditions (3/3)

- The current land uses around the New Terminal are:
 - craft industries
 - > transport agencies
 - wholesalers
 - > car service garages and car dealerships
 - training units, services
 - military facilities
 - residential areas
- The near area is degraded and risky. There are abandoned construction sites and factories within privately restricted areas

The New Terminal - KSYL (1/2)

- It will be serving all trips (domestic & international)
- It will relieve the road network around the existing old terminals
- 17 public transportation lines, metro station right opposite, directly connected via underpass with the new intercity bus terminal
- New city bus terminal serving 5 new public transportation lines connecting the city center and districts with the new terminal

The New Terminal - KSYL (2/2)

- It will provide an asset on economic and social level
- > It will **upgrade** a large area around it
- Hotel, cafes and other commercial facilities will be constructed
- Various commercial and leisure activities will take place
- On the other hand: it will bring about significant traffic related issues and will increase the accident probability occurrence

Scope

- Presentation of the urban street network upgrade around the new terminal
 - increase of number of lanes
 - design and construction of new road segments facilitating the arrival and departure to and from the terminal
- Presentation of the traffic model developed considering the new traffic demand, the mode choice distribution, the changes implemented in the street network
- Impact of the new project on traffic conditions

Study Area

- Areas around the existing terminals
- Near and greater area around the new bus terminal
- Several major road axes with high capacity and demand included

Peak hours traffic

- Kifisou Ave.
- >6000veh/h
- Iera Odos Str. >1100-1400veh/h
- Petrou Ralli Ave. east >1400 1500veh/h
- Petrou Ralli Ave. west >1800veh/h
- Athinon Ave.east >2350veh/h
- Athinon Ave.west
- >2800veh/h

Data Collection (1/2)

- Passenger demand of the intercity buses a weekday (typical day) & a public holiday (day with higher demand) during morning and evening peak hours
- Traffic data around the existing terminals
- Number of buses departing and arriving at the terminal
- Traffic counts at the entrance and exit of the terminals
- Questionnaire survey regarding the mode choice of the passengers

Data Collection (2/2)

- Traffic data at the road network around the new terminal
- Traffic volumes, speed and density from 74 loop detectors located on main road axes at typical weekdays and Sunday of May and August 2016
- Manual traffic counts in 23 intersections on a typical weekday (at morning and evening peak hour)
- Prediction of passenger demand for the period 2017-2040 estimated by using the ARIMA model: in 2030 → 28461 (typical day) & 51028 (holidays) in 2040 → 31790 (typical day) & 56995 (holidays)

Street Network Update

- Opening-widening of Agias Annas St. and Agiou Polukarpou Str. near the new terminal
- Reconstruction or reformulation of the network used for accessing the terminal
- Network appropriately designed for facilitating the intercity buses arriving to and departing from the terminal
 safely
 - without congestion, delays
 - without causing other traffic issues in the prevailing traffic

Questions Derived

- Will the station operation deteriorate the level of service of the intersections?
- Will the station operation cause additional traffic problems?
- Can the road network absorb the additional traffic that will be added and generated due to the operation of the new terminal and the other facilities (hotel, commercial centers, etc.)?

Traffic Modelling (1/3)

- Simulation software AIMSUN
- > 17 scenarios simulated, tested & analyzed considering:
 - ➤ the horizon of analysis (2017, 2020 and 2030)
 - the period within the day (morning/evening peak/ holidays)
 - changes in road segments geometry and infrastructure
 approaching & leaving routes of the intercity busses
- Estimation of the transportation modes passengers will use according to the questionnaire survey:
 60% metro
 - ≻ 14% car
 - ≽ 15% taxi
 - ➤ 11% other means of transportation

Traffic Modelling (2/3)

Volume map for the best scenario having the lowest impact on the traffic conditions of the road network of the near and greater area of the new terminal

Traffic Modelling (3/3)

- Most important and critical intersections
- Delay per vehicle
- Level of service
- Current situation and best scenarios
- Changes in signal plans of critical approaches where traffic volumes exceed capacity (LOS F) were implemented and tested

Intersection id		Current situation	Best Scenario	Difference (%)
20	Delay	40.6	49	21%
	LOS	D	D	-
18	Delay	50.0	61	22%
	LOS	D	Е	▼
3	Delay	177.9	217	22%
	LOS	F	F	-
17	Delay	-	17	-
	LOS	-	В	-

Conclusions (1/2)

- Transportation projects, urban regeneration and redevelopment actions can be combined to upgrade areas, their accessibility levels and the traffic and environmental conditions
- The new intercity bus terminal in Athens, will substitute two existing stations where the high traffic and high demand result in congested phenomena
- The main road axis in the area of the new terminal can absorb the additional traffic

Conclusions (2/2)

- Direct connection with the metro station as well as the new public transportation lines will shift the passenger demand towards public transportation
- Construction of parking garages and kiss&ride areas will diminish illegal parking and stops as well parking maneuvers which cause traffic disturbances and delays
- Changes in signal plans of critical approaches will improve traffic conditions
- The additional demand generated by all facilities of the terminal should be served in a way that higher percentages of users will shift to public transportation

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