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A Strategy Proposal for Road Infrastructure Development in Recession Times

Sergios Lambropoulos, Professor Emeritus

National Technical University of Athens, School of Civil Engineering, Greece

 The recent financial crisis in Europe has led the economies of many countries at its periphery into recession, which results in tight budgetary constraints and large reduction of public investment in infrastructure.

 It is therefore imperative for the State Decision Makers and Public Clients in these countries to review their approach, attitude and policy and compromise the planning, designing and scheduling of new infrastructure projects to the stringent reality of today's and to the fussy future of tomorrow.

In this lecture, we will:

- Review methodologies and practices conceived and implemented worldwide in order to tackle capital scarcity for infrastructure development.
- Discuss critically the current approach to planning, design and scheduling of infrastructure projects in Greece, a representative case since its economy is in recession for eight consecutive years.

In this lecture, we will:

- Present and analyze a number of transport infrastructure projects under construction or tendering; these include motorways, fixed links etc.
- Develop proposals regarding the necessary policy and good practices that the State and Public Clients should implement during recession times.

What can be done?

- Find possible additional financing resources.
- Exploit better existing infrastructure through small additional investments.
- Plan on the basis of sound Cost Benefit Analyses and design according to Value for Money.

Find possible financing resources



ΓΕΩΓΡΑΦΙΚΟ ΣΥΣΤΗΜΑ ΠΛΗΡΟΦΟΡΙΩΝ ΚΛΙΜΑΚΑ ΧΑΡΤΗ: 1:1.350.000 ΙΑΝΟΥΑΡΙΟΣ 2012

Find possible financing resources



Northern Motorway of Crete



Old Airport of Heraklion Crete



Motorway Financing

- Creation of the Cretan Road Fund.
- Exploit Old Airport Area (e.g. concession).
- Impose time related tolling (vignette) for all vehicles circulating in Crete.
- Impose additional fuel tax in Crete.
- Impose tolls on motorway sections.
- Use all above revenues for motorway construction.

Exploit existing infrastructure Thessaloniki East Ring road: Junction K7

 In order to upgrade the existing K7 junction at grade into a junction with grade separation the initial study foresaw the construction of a 350m twin tunnel. Finally the grade separation was achieved at a much lower cost by exploiting an existing overpass.



Thessaloniki East Ring road junction K7: Initial design

Thessaloniki East Ring road junction K7: As built



Junction K6 - Meteora



Junction of St. Paul





- In the recently constructed Attica Urban Railway there is no provision for park and ride near by the stations.
- The expropriated ex-construction sites, where park and ride facilities can be developed, are for sale.

Koropi urban railway station



Koropi station: proposed transfer center





Connecting the Metro and the Tram at Elliniko



Medieval Port of Rhodes



Wooden deck – pathway, length 550m and width 4 m

Port of Thessaloniki



Wooden deck – pathway, length 120m and width 8m







Value Engineering: FLY OVERS

Lee Roy Selmon Crosstown Expressway, Tampa Florida

Width: $\approx 20 \text{ m}$ Length: $\approx 8 \text{ km}$ Cost: $\approx 400 \text{ mil dollars}$

Completion:

2007





FLY OVERS

Bang - Na Expressway, Bangkok, Thailand 54km, completion: 2000



Fig. 18. Overview of progress in erection of bridge superstructure.

CONSTRUCTION METHODS





CONSTRUCTION METHODS

Kuala Lumpur Monorail





Completion: 2003Stations:11Length:8.6 km

THESSALONIKI EASTERN RING ROAD

Project Lenght: 8km Budget: 1500 million euro/ 500 million euro



Thessaloniki Eastern Ring road

- The initial design for the upgrading of the Thessaloniki eastern ring road foresaw in its 8km central section a new motorway parallel to the existing one consisting of a series of twin tunnels, covering almost all of its length. The environmental terms were approved and the design was completed.
- In line with the international experience, a flyover was studied with its piers founded on the one side of the existing motorway, i.e. half of the width of the fly-over would be on the top of the existing motorway.

PLANNING AND DESIGN

Thessaloniki Ring road: The fly-over option





Thessaloniki Ring road

 The new environmental terms were approved and the design was completed.

 The construction cost of the fly-over solution is estimated to the 60% of the tunnel one; the operation and maintenance cost and the environmental impact are by far less.

For urban tunnels, international practice reveals design solutions of great value. Such an example is the A86 Duplex Tunnel part of Paris Super-Peripherique, completed in January 2011. It is an innovative 10km tunnel, with a diameter of 10.4 m, exclusively for light vehicles and features two decks each with two traffic lanes and an emergency one. Each level is independent of the other.



Planning and Design Duplex A86, Paris Super- Peripherique







SMART, Kuala Lumpur The Stormwater Management And Road Tunnel combines stormwater and road traffic congestion relief Sg. Klang HOLDING POND STORAGE Sg POND Kerayong MODEI : NO STORMS Sg. Klang HOLDING POND STORAGE 59. POND Kerayong

MODE II : MOST STORM: Sg. Klang HOLDING POND STORAGE POND Kerayong MODE III : MAJOR STORMS - ANNUAL EVENTS (OCT '01) 10 km long Diameter 13.2m Completion 2007 Cost 515 mil USD

Mode I: Normal conditions

Mode II: Flood water diverted into lower channel. Motorway section still open to traffic

Mode III: Motorway closed to all traffic. Water-tight gates open and allow flood waters to pass through

Planning and Design Connection of Ymmitos western ring road to Athens inner ring road



Planning and Design Connection of Ymmitos western ring road to Athens inner ring road

AADT: 40 000 vehicles

- Traffic composition: 95% light vehicles.
- Ministry submission to Juncker Plan: 450 million euro
- Proposal: 130 million euro

Planning and Design Project Alignment





Ilioupoli tunnel cross sections Length: 3.10 km





Salamina Fixed Link



In several cases project design was prooved unsuccessful.

E.g.: E65 motorway Smokovo section. The construction of two twin road tunnels with total overall length of 600m, as well as the construction of two railway tunnels, could have been avoided should the two public clients cooperated efficiently.

Railway line and E65: Section Xyniada- Smokovo



Railway line and E65: Section Xyniada- Smokovo



Road Safety

 Road safety projects provide the highest value for money.

- Limited number of permits are required.
- Road safety studies for sections of 13000 km were launched in 2012.
- Currently, the Greek Ministry and the EIB are examining the financing of studies' implementation.

Recommendations 1/2

- CBA for all important projects should be obligatory by law and conducted by experienced consultants. They should be based on carefully elaborated traffic studies and cost estimates.
- The Public Clients, before project tendering, should conduct detailed VfM appraisals in order to reduce cost and increase value as much as possible.
- The Public Clients should investigate the possibility of project construction in stages in order to achieve best VfM.

Recommendations 2/2

- A special purpose Office should be created at the Ministry of Infrastructure. The Office should review the CBA, VfM and stage construction of all projects to be tendered. The remit of the Office should not be confined to the infrastructure projects of the various Ministries but also cover the important projects to be implemented by all Regions.
- Emphasis should be placed in the development of knowhow and personnel training.
- The State should give priority to the promotion of integrated programmes, e.g. TEN-T, and to coherent policies of national importance, e.g. road safety enhancement.

Conclusions

- The recession has had a profound adverse impact on projects' planning and has been a significant challenge for the prioritization of public investment.
- Current investment choices and the design options being selected reveal that there is still much room for improvement in the allocation of public resources in different infrastructure projects.
- In this direction, the proper implementation of the relevant methodologies of VfM and CBA as well as an increased degree of flexibility in construction scheduling are required.

Thank you

for your attention and patience!