CONSERVATION AND REVEALING OF CULTURAL HERITAGE AND SUSTAINABILITY AND PROTECTION OF ENVIRONMENT ALONG EUROPEAN MOTORWAYS: THE CASE OF EGNATIA MOTORWAY IN NORTHERN GREECE.

Asterios LIOLIOS
Professor of Democritus-University of Thrace,
Dept. Civil Engineering, GR-67100 Xanthi, Greece,
(liolios@civil.duth.gr),
and
Member of BoD, EGNATIA ODOS S.A.,
GR-57001 Thermi -Thessaloniki, Greece,
(Aliolios@egnatia.gr).
Abstract
The proposed idea concerns to develop strategies and interventions planned for European Motorways under design and construction as well as for existing ones in order to protect and assure sustainability and protection for the Environment on the one hand, and on the other hand to support conservation and revealing of the Cultural Heritage along European Motorways.
The case of Egnatia Motorway in Northern Greece.

- The Egnatia Motorway and its vertical axes are the backbone of Northern Greece transport system. 670 km long, it is the first high standard road axis that runs “horizontally” through Greece from Igoumenitsa to Kipoi-Evros. It shortens distances and brings areas like Epirus, Western Macedonia and Thrace out of their isolation. It multiplies investment in transport, industry and tourism and links the industrial centres of the West and the East.
ΜΕΙΩΣΗ ΧΡΟΝΟΥ ΑΝΑ ΤΟΜΕΑ
• The Egnatia Motorway is the most important modern infrastructure project concerning the development and communication of our country with Europe, the Balkans and Asia Minor. It is part of the Trans-European Transportation Network and one of the 14 priority projects in the European Union. The Egnatia Motorway is also a collector route for the Balkan and South-eastern European transport system. Pan-European Corridors IV (Berlin - Sofia - Thessaloniki), IX (Helsinki - Alexandroupolis) and X (Vienna - Belgrade - Thessaloniki) all end at the Egnatia Motorway.
• The Egnatia Motorway is connected with 4 ports, 6 airports and 9 vertical axes that ensure access to the countries of South-Eastern Europe. So, the total length (main axis and 9 vertical axes) is about **1.000 km** and the **total budget** amounts to **€ 6.770 M**, (VAT included).
PROJECT IDENTITY

- **AXIS LENGTH:** 670 km  
  (From Igoumenitsa through to Kipi)

- **TECHNICAL FEATURES:** Dual carriageway with a central reserve.  
  Two traffic lanes per carriageway plus a hard shoulder.

- **STANDARD CROSSSECTION:** 24.5 m

- **MAIN ENTRANCE–EXIT JUNCTIONS:** 50

- **OVERBRIDGES / UNDERPASSES:** 353

- **SERVICE ROADS** 720 km

- **TOTAL BRIDGE LENGTH** 2x40 km

- **TOTAL TUNNEL LENGTH** 2x50 km
TECHNICAL CHARACTERISTICS

- TUNNELS
- BRIDGES
### Technical Characteristics - TUNNELS

#### LONG TUNNELS ON THE EGNATIA MOTORWAY

<table>
<thead>
<tr>
<th>Region</th>
<th>Tunnel Name</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epirus</td>
<td>Dodoni</td>
<td>3,350</td>
</tr>
<tr>
<td>Epirus</td>
<td>Driskos</td>
<td>4,590</td>
</tr>
<tr>
<td>Epirus</td>
<td>T8</td>
<td>2,635</td>
</tr>
<tr>
<td>Epirus</td>
<td>Krimnos</td>
<td>1,080</td>
</tr>
<tr>
<td>Epirus</td>
<td>Neo Anilio</td>
<td>2,135</td>
</tr>
<tr>
<td>Epirus</td>
<td>Metsovo</td>
<td>3,550</td>
</tr>
<tr>
<td>Thessaly</td>
<td>Panagia</td>
<td>2,700</td>
</tr>
<tr>
<td>Western Macedonia</td>
<td>Syrto</td>
<td>1,500</td>
</tr>
<tr>
<td>Western Macedonia</td>
<td>Koiloma</td>
<td>1,080</td>
</tr>
<tr>
<td>Central Macedonia</td>
<td>S10</td>
<td>2,240</td>
</tr>
<tr>
<td>Central Macedonia</td>
<td>Paggiaio</td>
<td>1,100</td>
</tr>
</tbody>
</table>
DODONI TUNNEL
<table>
<thead>
<tr>
<th>Region</th>
<th>Structure Name</th>
<th>Carriageway length/up to 6m span</th>
<th>Height (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epirus</td>
<td>Aracthos</td>
<td>1.000/142</td>
<td>80</td>
</tr>
<tr>
<td>Thrace</td>
<td>Nestos</td>
<td>450/40</td>
<td>10</td>
</tr>
<tr>
<td>Macedonia</td>
<td>Greveniotikos</td>
<td>920/100</td>
<td>40</td>
</tr>
<tr>
<td>Epirus</td>
<td>Krystallopigi</td>
<td>850/55</td>
<td>30</td>
</tr>
<tr>
<td>Epirus</td>
<td>Metsovitiikos</td>
<td>540/235</td>
<td>100</td>
</tr>
<tr>
<td>Epirus</td>
<td>Votonoski</td>
<td>490/230</td>
<td>53</td>
</tr>
<tr>
<td>Epirus</td>
<td>Megalorema</td>
<td>480/45</td>
<td>28</td>
</tr>
<tr>
<td>Macedonia</td>
<td>G12 (section Polymylos-Lefkopetra)</td>
<td>465/110</td>
<td>90</td>
</tr>
<tr>
<td>Thrace</td>
<td>Lissos</td>
<td>450/45</td>
<td>15</td>
</tr>
<tr>
<td>Epirus</td>
<td>Mesovouni</td>
<td>260/100</td>
<td>30</td>
</tr>
</tbody>
</table>
EPIRUS: VOTONOSI BRIDGE
1650 γέφυρες συνολικού μήκους 80 km περίπου (μονού κλάδου)
The Environment & Cultural Heritage along the Egnatia Motorway

- Along its route, one can meet areas of exquisite natural beauty (e.g. the mountainous areas of Northern Pindos, the wetlands of Aliakmonas, Strimonas, Nestos and Evros Rivers, and Koroneia and Volvi Lakes) and of unique historic importance (e.g. the archaeological site of Dodoni, the remains of ancient Egnatia etc).

- The successive natural and manmade environments along the project are exceptionally diverse. The Egnatia Motorway runs through Greek landscapes of exquisite beauty and ecological importance. Its alignment follows the Ancient Roman Via Egnatia. Along this ancient route, within an approx. 1000 meters zone, 270 sites of historical interest have been identified, while, in its vicinity, significant archaeological sites and natural resources of critical importance are located. The Egnatia Motorway runs through Pindos and other Greek mountains and reveals a variety of exceptionally interesting geological formations, valleys and ravines.
EGNATIA ODOS A.E. proceeded to actions aiming at the protection and preservation of the cultural heritage of Greece, as well as at its enhancement, when this is feasible.

- Along its route, 270 sites of historical interest have been identified. EGNATIA ODOS A.E. has already financed more than 45 archaeological excavations along the axis at a cost amounting to € 11.5 million. The finds unearthed are significant and date back to various historical eras. In several cases, the motorway alignment was either changed or improved with costs amounting to € 80 million.

- Thus, EGNATIA ODOS A.E. has already financed more than 7% of the total budget for the Environment & Cultural Heritage frameworks. We note that the total budget is about 7,000 Million Euros.
Η ΕΓΝΑΤΙΑ ΟΔΟΣ Α.Ε. ΕΠΕΝΔΥΕΙ ΠΟΣΟΣΤΟ ΠΑΝΩ ΑΠΟ 7% ΤΟΥ ΣΥΝΟΛΙΚΟΥ ΠΡΟΫΠΟΛΟΓΙΣΜΟΥ ΤΟΥ ΕΡΓΟΥ ΓΙΑ ΤΗΝ ΠΡΟΣΤΑΣΙΑ ΤΟΥ ΠΕΡΙΒΑΛΛΟΝΤΟΣ ΚΑΙ ΤΗΣ ΠΟΛΙΤΙΣΤΙΚΗΣ ΚΛΗΡΟΝΟΜΙΑΣ
70 περιοχές προστασίας άγριας ζωής (πρώην καταφύγια θηραμάτων)
Η ΠΕΡΙΒΑΛΛΟΝΤΙΚΗ ΔΙΑΧΕΙΡΙΣΗ ΤΟΥ ΤΜΗΜΑΤΟΣ ΠΑΝΑΓΙΑ - ΓΡΕΒΕΝΑ

ΒΙΟΤΟΠΟΣ ΚΑΦΕ ΑΡΚΟΥΔΑΣ
ΑΝΑΔΕΙΞΗ ΙΣΤΟΡΙΚΩΝ ΜΝΗΜΕΙΩΝ

ΜΕΤΑΦΟΡΑ ΠΑΡΑΔΟΣΙΑΚΟΥ ΓΕΦΥΡΙΟΥ ΣΤΗΝ ΠΕΡΙΟΧΗ ΣΕΝΙΚΟ ΤΟΥ Ν. ΙΩΑΝΝΙΝΩΝ
ΠΡΟΣΤΑΣΙΑ ΠΟΛΙΤΙΣΤΙΚΗΣ ΚΛΗΡΟΝΟΜΙΑΣ

ΑΡΧΑΙΟΛΟΓΙΚΕΣ ΑΝΑΣΚΑΦΕΣ

ΑΝΑΔΕΙΞΗ ΑΡΧΑΙΟΛΟΓΙΚΩΝ ΧΩΡΩΝ & ΙΣΤΟΡΙΚΩΝ ΜΝΗΜΕΙΩΝ

ΑΛΛΑΓΗ ΧΑΡΑΞΕΩΝ ΚΑΙ ΤΕΧΝΙΚΩΝ ΕΡΓΩΝ
ΑΛΛΑΓΗ ΧΑΡΑΞΗΣ ΚΑΙ ΚΑΤΑΣΚΕΥΗ ΣΗΡΑΓΓΑΣ ΣΤΗΝ ΠΕΡΙΟΧΗ ΤΟΥ ΑΡΧΑΙΟΥ ΘΕΑΤΡΟΥ ΔΩΔΩΝΗΣ
ΑΛΛΑΓΗ ΧΑΡΑΞΗΣ ΚΑΙ ΚΑΤΑΣΚΕΥΗ ΣΗΡΑΓΓΑΣ ΣΤΗΝ ΠΕΡΙΟΧΗ ΤΟΥ ΑΡΧΑΙΟΥ ΘΕΑΤΡΟΥ ΔΩΔΩΝΗΣ
• So, the realization of the project idea for European Motorways has multiple significance. E.g., the development of restoration compatible materials and proper interventions for the earthquake protection of historic monuments, e.g. old stone bridges, is very important as concerns Cultural Heritage along European Motorways under construction or existing ones..
• **Expertise of the partners**

• The project is the result of the cooperation of the following participants, having significant expertise in corresponding fields:


  3. Prof. A. Moropoulou, National Technical University of Athens - Sch. of Chemical Engineering - Sect. of Materials Science & Engineering, Athens, Greece.

  4. Prof. C. Syrmakezis, National Technical University of Athens, Sch. of Civil Engineering - Structural Engineering Div., Greece.

  5. Skarlatos V., TEKTON S.A. “Ready Mix Concrete & Aggregate Co”, (production of Self-Compacting Concrete), Xanthi, Greece.

  6. Prof. A. Liolios, Member of the Board of Directors, EGNATIA ODOS S.A., 6th km Thessaloniki-Thermi, Greece.
## Vertical Axis
**Siatista – Kristallopi / Ieropigi**

<table>
<thead>
<tr>
<th>Description</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open to traffic</td>
<td>22 km</td>
</tr>
<tr>
<td>Under construction</td>
<td>29 km</td>
</tr>
<tr>
<td>Old section – Nat. Road (Koromilia-Kristallopi)</td>
<td>29 km</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80km</strong></td>
</tr>
<tr>
<td>Under Design</td>
<td></td>
</tr>
<tr>
<td>New alignment – Motorway (Koromilia – Ieropigi – CSF IV)</td>
<td>20 km</td>
</tr>
</tbody>
</table>
VERTICAL AXIS
THESSALONIKI – SERRES – PROMACHON
96km

- Open to traffic 15.0 km
- Under construction 81.0 km
## VERTICAL AXIS
### ARDANIO – ORMENIO 124km

<table>
<thead>
<tr>
<th>Category</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open to traffic</td>
<td></td>
</tr>
<tr>
<td>- Ministry</td>
<td>14km</td>
</tr>
<tr>
<td>- EOAE</td>
<td>37km</td>
</tr>
<tr>
<td></td>
<td>51 km</td>
</tr>
<tr>
<td>Under construction</td>
<td>33 km</td>
</tr>
<tr>
<td>Old section – Nat. Road</td>
<td>39 km</td>
</tr>
<tr>
<td>To be upgraded – 4th CSF</td>
<td></td>
</tr>
</tbody>
</table>
PROJECT FUNDING

Period 1994-1999
1415 M€ (VAT not included)

- GR STATE 565
- ERDF 535
- CF 315

Period 2000-2006
3225 M€ (VAT not included)

- GR STATE 1765
- ERDF 915
- CF 492
- TEN 33

GR STATE
TOTAL: 4.640 M€ (VAT not included)

EU
2.350
2.290

EIB Loans
1.950
COST ANALYSIS

Construction 80%
Expropriations 8%
Design 5%
Project Management 7%

TOTAL COST: 5.760 M€ (without VAT) / 6.770 M€ (VAT included)
### Project Status – Cost

#### Egnatia Motorway

<table>
<thead>
<tr>
<th>Description</th>
<th>Length (Kms)</th>
<th>Total Cost (M€ VAT incl.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sections constructed during previous periods before <strong>1994</strong></td>
<td>25</td>
<td></td>
</tr>
<tr>
<td><strong>PROJECTS AFTER 1997</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Egnatia Odos S.A. responsibility (CSF II &amp; III)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Completed and <strong>opened to traffic</strong> (October 2006)</td>
<td>446</td>
<td><strong>2.880</strong></td>
</tr>
<tr>
<td>• Under construction (to be open to traffic during 2006)</td>
<td>34</td>
<td><strong>3.020</strong></td>
</tr>
<tr>
<td>• Other sections under construction</td>
<td>165</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL AXIS</strong></td>
<td><strong>670</strong></td>
<td><strong>5.900</strong></td>
</tr>
</tbody>
</table>
## Project Status – Cost

### Vertical Axes

<table>
<thead>
<tr>
<th>Description</th>
<th>Length (Kms)</th>
<th>Total Cost (M€ VAT incl.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sections constructed during previous periods before 1994</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Open to traffic</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td><strong>PROJECTS AFTER 1997</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Egnatia Odos S.A. responsibility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Completed and <strong>opened to traffic</strong> (October 2006)</td>
<td>64</td>
<td>195</td>
</tr>
<tr>
<td>• Sections <strong>under construction</strong></td>
<td>143</td>
<td>465</td>
</tr>
<tr>
<td>• <strong>Under design</strong> existing national road to be upgraded (CSF IV projects)</td>
<td>69</td>
<td>150</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>300</td>
<td>810</td>
</tr>
</tbody>
</table>
TOTAL EOAE PROJECTS ABSORBED FUNDS PER YEAR

- **Per Year**
- **Cumulative**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Per Year</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>1995</td>
<td>40</td>
<td>48</td>
</tr>
<tr>
<td>1996</td>
<td>76</td>
<td>124</td>
</tr>
<tr>
<td>1997</td>
<td>177</td>
<td>301</td>
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<tr>
<td>1998</td>
<td>297</td>
<td>598</td>
</tr>
<tr>
<td>1999</td>
<td>383</td>
<td>981</td>
</tr>
<tr>
<td>2000</td>
<td>550</td>
<td>1531</td>
</tr>
<tr>
<td>2001</td>
<td>746</td>
<td>2277</td>
</tr>
<tr>
<td>2002</td>
<td>651</td>
<td>2928</td>
</tr>
<tr>
<td>2003</td>
<td>579</td>
<td>3507</td>
</tr>
<tr>
<td>2004</td>
<td>572</td>
<td>4079</td>
</tr>
<tr>
<td>2005</td>
<td>630</td>
<td>4709</td>
</tr>
<tr>
<td>2006</td>
<td>720</td>
<td>5429</td>
</tr>
<tr>
<td>2007</td>
<td>740</td>
<td>6169</td>
</tr>
<tr>
<td>2008</td>
<td>600</td>
<td>6769</td>
</tr>
</tbody>
</table>

**TOTAL EOAE PROJECTS ABSORBED FUNDS PER YEAR**

- 800,0 M€
- 100,0 M€
- 200,0 M€
- 300,0 M€
- 400,0 M€
- 500,0 M€
- 600,0 M€
- 700,0 M€
- 800,0 M€

YEAR

**1994**

**1995**

**1996**

**1997**

**1998**

**1999**

**2000**

**2001**

**2002**

**2003**

**2004**

**2005**

**2006**

**2007**

**2008**

**6770** M€
THE COMPANY
EGNATIA ODOS S.A.
Company Objectives

- to **Design, Manage, Supervise, Construct, Maintain, Organize, Equip** and **Operate** the Egnatia Motorway, the road network generally connecting or servicing, directly or indirectly, the above axis, as well as other road works in Greece or abroad.

- to **Award**, in part or as a whole, to third parties, the design, construction, expansion of the axis or sections of the axis through concession, in compliance with the standing provisions, as well as to **supervise and monitor the execution** of associated contracts and to **check respective designs**.

- to undertake the **execution of other projects** after the issuing of the Ministerial Decision.

- To prepare **recommendations and advise** on issues related to all of the above.
Running Projects

- Egnatia Odos Motorway
- Vertical Axis to Greek borders
- Upgrading of Junctions on the Ring Road of Thessaloniki
- Upgrading National Road to Chalkidiki Prefecture
- Upgrading Roads Network of many Greek Islands
- Consultants to the Ministry for PPP’s Projects
- Technical Secretariat of Thessaloniki – Instaboul road connection
- The New Bridge at Greek – Turkish Borders
- Technical Consultant of Corridor X for Serbian sections (Feasibility Studies, Cost Analysis)
- Technical Secretariat of Black Sea Ring Highway
COMPANY STRUCTURE

- Managed by a 9-member BoD and a 5-member Managing Committee
- With the participation of External Consultants:
  - Project Manager
- Personnel: 283 employees
  - 65% engineers
  - 35% administrative staff
AUDITS

- **External Audits**
  - E.U funding bodies
  - Public Sector bodies
  - Private Sector bodies authorized by the Greek State

- **Internal audits**
  - Through the quality management systems
  - Through internal auditors
Project Monitoring Information Systems

1. Electronic Management System for Documents and Designs (Primavera Expedition)
2. System for Cost Control & Contract Management (Primavera Expedition)
3. Project Planning (Primavera Project Planner)
4. Integrated Project Information System (PIS)
5. Geographical Information System (GIS)
PROJECT MONITORING & MODERN PROJECT MANAGEMENT SYSTEMS

- Monitoring of Community Financing Programmes
  - Projects Bulletins
  - Funding Flow
  - Proposals for the MEPPW Investment Programme
  - Information to Managing Authorities
  - Information to the European Investment Bank
OPERATION – EXPLOITATION – MAINTENANCE

Road Maintenance
- Operations & Maintenance Guidelines
- Routine Maintenance Manual

Road Operation
- Tunnel Operation / Tunnel Emergency Plans

Road Exploitation
- Toll Stations
- 17 Services Areas & 23 Rest Areas

Road management
- 5 Motorway Administration Centers (MAC)
- Telematics Applications