2025

OMEK CONSULTING ENGINEERS

SPECIALISTS IN MAJOR MOTORWAY PROJECTS

OMEK Consulting Engineers S.A. has played an important role in the Design, Supervision and Delivery of the vast majority of Major Infrastructure and Development Projects in Greece since 1994.

In all these years, **OMEK** has demonstrated a significant capability of providing High Quality Services in all Fields of Engineering Projects, in combination with the provision of an integrated package of Managerial, Technical, and Contractual support services, in all phases of the Projects.

Indicative ***Major Highway Projects*** where ***OMEK*** provided high quality services are:

- **Project Management Consultant** of the Patra - Athens - Thessaloniki - Evzoni Motorway – South PATHE Motorway for 18 Public Works Contracts (period 1996 to 2001). The Contracts Supervised were summing Construction Budget nearly of half (0,5) billion €.

- **Technical Consultant** at the State Service EYDE/MEDE (period 2006 to 2008) regarding the Project of Agrinio By Pass Motorway which was constructed under a Public Works Contract. This is the State New Section delivered later to the Concessionaire of Ionia Odos and the Motorway built was 21 km from the end of Aggelokastro I/J to the end of Kouvaras I/J (No further analysis below).

- **Construction Supervision Management** Services at EGNATIA ODOS S.A. regarding the **Egnatia Odos Motorway** Western region, area from Port of Igoumenitsa to Metsovo (period 1997 to 2006). The Contracts Supervised were summing Construction Budget nearly of one and a half (1,5) billion €.

- **Independent Engineer in the Concession Projects of: IONIA ODOS & PATHE MOTORWAY and CENTRAL GREECE (E65) MOTORWAY** summing a total Design and Construction Budget of two and a half (2,5) billion €.

Project Management Consultant of the Patra - Athens - Thessaloniki - Evzoni Motorway – South PATHE Motorway (period 1996 to 2001).

OMEK Role: Project Management Consultant of the Ministry of Public Works (EYDE/PATHE) for the Period 1996 - 2001.

OMEK Supervised Contracts adding Budgets of about 500,000,000.00 Euros

At the time of OMEK Services, 18 main Construction Contracts were Supervised.

The above contracts included the following Major Works:

- a) **Full Construction of Motorway at a length of 115,0 km** together with the Service Roads (Earthworks, Pavement, Asphalt Works, Drainage Works, Signage and safety, E/M Installations and Irrigation Network.
  b)Construction of 14 Interchange Junctions

- a) **Bridges, Overpasses of 7,100m length** on single carriageway length (at Patra, Kakia Skala and Thiva)
  b) **Tunnels and Cut and Covers of 10,135m length** on single carriageway (at Patra, Kakia Skala)
  c) Piles and Gravity Retaining Walls of 10,000m length on single carriageway (at Patra, Kakia Skala, Malakasa, Thiva and Lamia)
  d) 45 Underpasses (at Patra, Thiva, Lamia),
  e) Rivers Diversion of about 3,000m length on single carriageway
  f) More than 500 Small Concrete Structures (at Patra, Kakia Skala, Thiva and Lamia)

- Other Special Structures
  a) Special Works for the Construction of the Motorway part at a length of 500m, passing over an old area of wastes disposal in Patra.
  b) 1 Tolls Station

- Protection Works for Antiquities, for 2 cases of special environmental protection areas and for the Yliki Lake are

Construction Supervision Management Services at EGNATIA ODOS S.A. regarding the **Egnatia Odos Motorway** Western region, area from Port of Igoumenitsa to Metsovo (period 1997 to 2006).

The area that Western area of Egnatia Motorway passes through is characterised by a vast variety of geological formations and geotechnical conditions. It is not rare that structures and earthworks constructed along the Motorway needed to be protected against geological changes (landslides, liquefactions, etc). **In all Western Region of Egnatia Odos, Major Geotechnical Aspects were most likely to be met**

Approximately 30% of the Egnatia Motorway total length in Epirus comprises of major technical projects. In particular there were constructed:

- **32 twin bore tunnels covering 30 km of motorway (58 km of single carriageway)**
- **Many split-deck bridges covering 7.5 km of motorway (15 km of single carriageway). Five of them have length on Motorway larger than 500 m. The Egnatia Bridges were built with a variety of Construction Methods in their Foundation works (Soil Improvement, Bored Piles, Shafts etc.) and Deck (Balance Cantilever, Moveable Scaffolding System, Gradual Bridge Deck Launching, Precast – Prestressed Beams)**

The Demanding Geotechnical Works in EGNATIA ODOS

The main geotechnical problems that needed to be handled and solved, were:

- The **high seismicity of the area** crossed by the Egnatia Odos project was the most important factor that demanded careful design.
- **Landslide areas**, met all over Western part of Egnatia (region of Epirus) and especially at the area of Metsovo where Flysch formations are predominant.
- **Construction works in riverside areas** characterized by extensive deposits of soft compressible soils.

The Demanding Geotechnical Works in EGNATIA ODOS

Major Geotechnical Works included:

- **Piles Walls** (including Berlin Wall type).
- **Prestressed Anchors** to stabilize greater Landslide areas
- **Reinforced Earth with Concrete Panels** in difficult ground morphologies.
- **Special Ground Improvement** techniques like Jet Grouting
- **Reinforced Embankments** using Geotextiles.
- **Deep cuts and high embankments**

Also a series of **Major Structures** were founded on **Bored Piles or Rock Replacing Shafts.**

The Demanding Geotechnical Works in EGNATIA ODOS

Tunnels Excavation and temporary Support in EGNATIA ODOS

Amongst the 5 Longest Tunnels of Egnatia Odos, the 3 were Supervised by OMEK SA, whilst in 1 OMEK SA was involved in the preparatory stages as Construction Supervision Consultant.

EGNATIA LONGEST TUNNELS SUPERVISED BY OMEK

- Driskos Tunnel, Length: 4.563m and 4.581m (the longest Highway Tunnel in Greece at that time)
- Dodoni Tunnel, Length: 3.347m per bore
- Anilio Tunnel, Length: 2.201m and 2.152m

Tunnels Excavation and temporary Support in EGNATIA ODOS

SUMMARY

a. IGOUMENITSA – IOANNINA and PERISTERI AREA TUNNELS

In this area, ten (10) Double Bore Tunnels and three (3) C&C were constructed and supervised by OMEK SA staff.
Total Tunnels Bored Length at the area from Igoumenitsa to Peristeri = **30.356m**

a. METSOVO AREA TUNNELS

One of the most difficult terrains that Egnatia Odos met were at the area of Metsovo. The **dominant area geology is by Flysch**.

In this area, seven (7) consequent Double Bore and one (1) Single Bore Tunnels were constructed and supervised by OMEK SA staff.
Total Tunnels Bored Length at the area from Peristeri to Metsovo =**13.278m**

Tunnels Excavation and temporary Support in EGNATIA ODOS

Total Tunnels Bored Length at the area of Western Egnatia(*) = 43.634m

(*) 21 Tunnels (including 3 C&C) Supervised by OMEK SA

Major Bridges of all Types of Construction Methods in EGNATIA ODOS

Amongst the 7 Longest Bridges of Egnatia Odos, the 3 were Supervised by OMEK SA, whilst in 2 OMEK SA was involved in the preparatory stages as Construction Supervision Consultant.

EGNATIA LONGEST BRIDGES SUPERVISED BY OMEK (belonging in the 7 Major of Egnatia)

1. **Kristalopigi Bridge (Valley Bridge near Paramithia)**
2. **Votonosi Bridge (River Bridge near Metsovo)**
3. **Megalorema Bridge (Valley Bridge near Metsovo)**

Major Bridges of all Types of Construction Methods in EGNATIA ODOS

Kristalopigi Bridge (Valley Bridge near Paramithia)

Length of right carriageway: 848m and 12 Spans.
Length of left carriageway: 680m and 8 Spans

Maximum Pier height: 30m

Construction method: MSS (Moveable Scaffolding System)

Major Bridges of all Types of Construction Methods in EGNATIA ODOS

Votonosi Bridge (River Bridge near Metsovo)

The Bridge covers the span area in between two Tunnels (Anthohori and Votonosi)
Length of right carriageway: 477.20m
Length of left carriageway: 490.5m
Number of spans: 3+3 (left and right carriageway)
Maximum span length: 230m – together with Metsovitikos River Bridge, The second in Greece after Rio Bridge
Maximum pier height: 53.30m
Midpiers Foundation: Shafts Replacing Rockmass at a Depth of 25 - 35m and Diameter 13m.
Construction method: Balanced Cantilever

Major Bridges of all Types of Construction Methods in EGNATIA ODOS

Megalorema Bridge (Valley Bridge near Metsovo)

Length of right carriageway: 518,90m
Length of left carriageway: 487,80
Number of spans: 11+11 (left and right carriageway)
Maximum pier height: 32m
Midpiers Foundation: 8 Bored Piles Φ1,20 and Depth 17 – 25m
Construction method: Gradual Bridge Deck Launching

Traffic Management System (TMS) and Tolls Collection Systems (TCS), together with the regular Motorway E/M Equipment and Installations in EGNATIA ODOS

OMEK Compiled the Design for the ITS applications at Egnatia Odos Polymylos – Veria highway section, which was the first of that type and formed the base of all SCADA applications in the Whole Motorway

Traffic Management System (TMS) and Tolls Collection Systems (TCS), together with the regular Motorway E/M Equipment and Installations in EGNATIA ODOS

System Analysis

- Targets of the Telematics System
- User Needs

System Design

- User services
- System Operation – Logical Architecture
- Telematics subsystems – Physical architecture

Implementation Strategy User services

- Highway characteristics and segmentation
- Strategy of implementation – cost model
- Procurement methods

Innovative Project Management Systems in EGNATIA ODOS

QUALITY MANAGEMENT SYSTEM (QMS)

Special tailor-made Quality Management System was developed for the Construction Supervision Consultancy Services.

Following 2 years of the above QMS implementation, in 2003, the Client (Egnatia Odos) requested that OMEK would develop a relevant Quality Program to serve their duties for the Construction Supervision Works all over Egnatia Odos. This was developed and is still implemented in all Egnatia Projects even today.

The developed **QMS** provided **Working Instructions and Procedures for all Processes** related to the Supervision Services.

The **QMS** developed provided amongst others **analytical Check Lists** for all Construction Entities, it included also special **Procedures and Check Lists** for matters related to the **Health & Safety and the Environment,** It also resulted in implementation of adequate **Internal Procedures of the Consultant**, providing directions related with Communication Lines, Internal Training and Audits etc.

The OMEK Quality Department at that time had 5 Quality Specialists.

This strict Qualitative approach resulted in a uniform operation of the Supervision Organization, avoiding personal policies. It also secured that all Contractors knew in advance the Supervision Authority Level of Requirements. It served fully the Client needs.

Innovative Project Management Systems in EGNATIA ODOS

Works Breakdown Structure (WBS) – Codification and Control of all Processes

The most important innovation imposed by OMEK through the implementation of the above described QMS is the development of the Project **Works Breakdown Structure (WBS)** which is the basic tool to control all the Project related Processes.

The **WBS analysis** is depended on the needs of each Project such as the need for detailing various Project Processes, the need for the level of Risk Management, Control and Monitoring, the accuracy of evaluation and the estimated value and the time schedule of each selected Entity.

Its development is made by approaching and analyzing the **Works hierarchical structure,** which is reflected in the **Codification** of Contract documents, the designs' drawings and reports as well as the codification of construction Works documentation. Same WBS and Codification are implemented for all project control processes such as the Project's Time Schedule, the Cost Scheduling and Cost control.

Innovative Project Management Systems in EGNATIA ODOS

Project Management Information Systems

A well-established QMS, together with an appropriate setup of a WBS form the basis for the establishment of an appropriate **Management Information System (MIS**) reflecting the specific Project technical scope and the specific Works Contract.

This (though implemented in late stages) resulted to a certain extend in the Client having **simultaneous Cost and Time Control of many Contracts**, many of which were interfacing (i.e. Civil and E/M Works with different Contractors). **Basic principles for this** were that:

a. Each Construction Entity based on the WBS and having a Unique Codification, represented a certain **Construction Cost and Time Duration**.
b. The **Cost Control** that was finalized through the Monthly Certifications was set under the baseline hierarchical structure having direct reflect to the **Construction Entity Progress**.
c. The unified codification for the **Primavera Project Planner** (obviously this can be done with other Programs also), resulted in the **Projects Schedule Control**, **setting interrelations between the Cost and the Project Physical Progress.**
d. Through this tool the Project Owner had the ability to obtain multiple information as output of the Data Base, making in this way easier the Decision Making operation.

Innovative Project Management Systems in EGNATIA ODOS

Project Management Information Systems

The above type of approach can always further be developed and be tailor-made for any Project under the Guidance and **"know-how" of OMEK Experts**, by extending implementation of the Hierarchical WBS based approach, in the fields of online and in real time auditing of various Project Processes such as

- Designs Checking in real time and online (this is common with other data bases also).
- Objective Evaluation of Contractors Claims relevant to the Time Related Costs and the Disruption Costs.
- Direct input of Quality and Geometry Controls data giving the ability of evaluation of their results acceptance.
- Direct information of the materials incorporated in the Project, with the demonstration of Certificates and Testing Documentation.
- Direct information about the results of Audits and Inspections.
- Simplicity in compiling the Project Registry

Indicative of this was the establishment and development of an Online Document Management System (ODMS), for the operation of the Concession Projects Independent Engineer J/V, which was the minimum achieved.

OMEK Staff Experience gained in EGNATIA ODOS

EGNATIA ODOS MOTORWAY PROVED TO BE THE SECOND UNIVERSITY FOR MANY OMEK ENGINEERS AND THIS FORMS AN EXCELLENT "KNOW - HOW" FOR MAJOR HIGHWAY PROJECTS.

OMEK SA provided the appropriate environment and the opportunities for Greeks and Ex Patriots Engineers of High Engineering Level and Experience to get involved in EGNATIA ODOS Project. This Environment gave the opportunity to other younger Engineers to upgrade their knowledge and qualifications, forming in this way an infinite source of Consultants covering all areas in Project Management and Engineering at major Highway Infrastructure Projects.

OMEK SA together with its partners had cooperated with more than 100 Engineers through the years 1997 – 2005.

Most of them were at the age of 30 – 40 years old at that time, being today competent Expertise Engineers in all Highway Disciplines.

Indicatively the approximate number of Greek Engineers that OMEK cooperated at that time were:

1. **Tunnel Experts: 8 Geologists and Engineers.**
2. **Geotechnical Experts: 6 Engineers**
3. **Bridge Experts: 5 Engineers**
4. **Topographers – Highway: 14 Engineers**
5. **Drainage Experts: 4 Engineers**
6. **E/M Experts: 5 Engineers**
7. **Quality Control and Materials: 10 Engineers**
8. **Quality Assurance: 5 Engineers**
9. **Health and Safety Experts: 2 Engineers**
10. **Environmental Experts: 2 Engineers**
11. **Contract Specialists: 4 Engineers**
12. **Cost and Schedule Control: 12 Engineers**
13. **Site Supervisors: more than 30 Engineers**

With most of the above, OMEK has kept regular contact and many of them were the pool for the Concession Highway Projects.

Independent Engineer in the Concession Projects of:

IONIA ODOS & PATHE MOTORWAY and CENTRAL GREECE (E65) MOTORWAY (Period 2007 till today)

The Project was successfully delivered to the traffic and the Works Completion Certificate (WCC) for the Designs and Constructions Period was issued in December 2017.

The Project includes the:

(i) **"Ionia Odos" Motorway,** of an approximate length of 196 km. from Antirrio to the Egnatia I/C,

(ii) **PATHE Motorway**, of an approximate length of 172,5 km. from the Metamorphossi I/C to Skarfia

Project's Construction Budget: 1.070.053.317,00 € plus Prices Revision.

The IONIA MOTORWAY object included amongst others the following Design and Construction Works:

- 196 km of a new, modern and high-standards motorway
- **4 Bidirectional Tunnels of total length 11,2 km**
- **24 Bridges of total length 7 km**
- major Embankments and Cut Slopes needing special engineering solutions such as embankments preloading and reinforcement, Cut Slopes anchoring and bolting etc
- 77 underpasses and 24 overpasses, 392 culverts of various dimensions and types
- 19 Interchanges
- 4 Frontal & 4 Toll Administration Buildings and 5 Lateral Toll Stations
- Motorist Service Stations (MSS), Maintenance & Control Centers, Operation & Maintenance Centers,

The PATHE MOTORWAY contract object included mainly Design and Construction Works for reconstruction and rehabilitation of the Existing Pavement, Reconstruction / Elevation of the existing central reserve barrier – New Jersey type, Reconstruction of side formations and triangular gutters, Replacement of old type bridge barriers and installation of new barriers according to OMOE-SAO, in 57 single bridge side curbs, Upgrading of ITS / TMS / TCS.

Also Whole new motorway construction for approximately 7 km, Parking areas, 23 Interchanges implementing rehabilitation of pavement, safety and signage works, Street Lighting Works,

OMEK CONSULTING ENGINEERS

CENTRAL GREECE MOTORWAY E-65 CONCESSION PROJECT - INDEPENDENT ENGINEER for the T1 Period (D&C).

Part of the Project (for the Designs and Constructions of T1 Period at a length of ~79 km from Ch. 32+270 to 111+387), was successfully delivered to the traffic and the Works Completion Certificate (WCC) was issued in December 2017.

The Project that the Concessionaire undertook to design, finance, construct, operate and maintain, is the:

(i) **Central Greece Motorway E-65**, with technical object the construction of New Motorway Sections of an approximate length of 174 km starting from PATHE semi I/C to the Egnatia I/C,

(ii) **PATHE existing Motorway**, with technical object the Rehabilitation and Safety Upgrading Works at an approximate length of 57 km starting from Skarfia (location of HSRT overpass) to Raches.

The a **total Project's Construction Budget** as revised in November 2014 **is 1,322,375,767.84 €.** From the above, the amount already absorbed within the completed T1 Period is 546,973,553.06 € for Civil and E/M Works and the amount of ITS/TMS works is 20,033,306.56 €, summing in this way a **total Project's T1 Period Construction Budget (already completed) to the amount of 567,006,859.62 €. PERIOD T2 is now expected to commence in January 2018.**

The Central Greece E-65 Project T1 Period object included amongst others the following Design and Construction Works (including PATHE Upgrading works),:

- About 80 km of a new, modern and high-standards motorway
- **3 Bidirectional Tunnels of total length 6.950 m**
- **9 Bridges of total length 1.600 m**
- major Embankments and Cut Slopes needing special engineering solutions such as embankments preloading and reinforcement, Cut Slopes anchoring and bolting etc
- 41 Bridges, Overpasses and Underpasses of length less than 50 m each, 167 Box Culverts
- 8 Interchanges
- 4 Frontal & 4 Toll Administration Buildings and 14 Lateral Toll Stations
- Motorist Service Stations (MSS), Maintenance & Control Centers, Operation & Maintenance Centers.

DESIGNS

The Independent Engineer for Ionia Odos – PATHE and Central Greece (E65) Highway Concession Projects, was responsible for the Final Designs Approvals. All Designs Disciplines were reviewed both in-house and with external Checkers been used in the most difficult cases.

Designs Approvals for Ionia Odos & PATHE Issued reached 1,480 items

Designs Approvals for Central Greece (E65) Issued reached 730 items

Total Designs Approvals 2,210 items

The Designs included all disciplines related to the Motorway such as:

DESIGNS

CIVIL ENGINEER WORKS Designs	E/M and TMS Designs
• Motorway Highway – Alignment. • Hydraulics and Drainage. • Geotechnical Designs including Structures Foundations. • Tunnels Excavation & Temporary Support. • Structural Designs of all types (Major and Minor Bridges, Tunnels Final Lining, Cut & Covers, Retaining Walls, Box Culverts). • Pavement. • Safety and Signage. • Buildings Works. • Plantation and Landscape restoration. • Temporary Traffic Arrangements.	• Street Lighting • Underpasses Lighting • Various Tunnels E/M (including Tunnel Lighting, Power Distribution, Ventilation, Fire Fighting System etc.) • Irrigation System. • ITS – Traffic Management (TMS), including CCTV & AID, Conovis & Air Speed, ERT Telephones, LCS, Loop Detectors, Photometers, Public Address, Traffic Lights, VMS, VSLS, PLC Panels, Tunnel Control Room, Network Integration • Tolls Collection Systems (TCS) • Buildings E/M Installations.

MAJOR EARTHWORKS in IONIA ODOS

Pile Walls

Ch. 9+740 to Ch. 9+900, Alikyrna for Antiquities protection.

Pile wall at Ch. 123+885 – 124+091, total length 206.16m, of varying height (1.50 ~ 3.50m), diameter of piles 0.80m and prestressed anchors.

MAJOR EARTHWORKS in IONIA ODOS

Pile Walls

Pile Wall at Ch. 110+200

Cut Slopes support with various measures such as anchoring with Passive anchors, Drainage holes, slopes lining with three - dimensional geosynthetics for protection against corrosion etc.

Cut at Ch. 18+535 – 18+832, slop 3:1 length 297m, max height 29,6m.

Cut & Cover at Kalydona Tunnel Entrance Portal

MAJOR EARTHWORKS in IONIA ODOS

Anchoring of Cut Slopes with Passive anchors, Drainage holes, slopes lining with three - dimensional geosynthetics for protection against corrosion etc

Cut at Ch. 120+380 to 120+600, on both Motorway Branches, slop 2:3 length 220m, max height 19,5m

Cut at Ch. 117+560 to 118+260 **(the longest in Ionia Odos),** slop 2:3, length 700m, max height 33.30m..

Cuts C25A, C26A, C27A Ch. 167+1 00 ~ Ch. 167 + 650 Configuration of contiguous Cuts (hmax = 45.00 m), in limestone zone

MAJOR EARTHWORKS in IONIA ODOS

Anchoring of Cut Slopes with Prestressed anchors on reinforced concrete beams, Permanent Anchors, Drainage holes, slopes lining with three - dimensional geosynthetics and Utah Grid and Hydroseeding.

Cut C5, at Ch.152 + 820 ~ Ch. 153 + 480

MAJOR EARTHWORKS in IONIA ODOS

Ground Improvement for Foundation of Motorway with **Wick Drains and / or Preloading Embankments** at various places such as Ch. 14+300 – 15+000, Ch. 15+500 to 15+400, Ch. 100+300, Ch. 128+100 to 129+400, Philippiada I/J at Ch.147 + 150 ~ 147 + 650 and Avgo I/J at Ch. 186+450 ~ 187+250

Ch. 128+100 to 129+400


Ch. 15+500 to 15+400


Avgo I/J at Ch. 186+450 ~ 187+250

MAJOR EARTHWORKS in IONIA ODOS

Reinforced Embankments with geogrids and gabion wall at various places such as at Ch. 6+068.91 - 6+169.42, and Ag. Ilias I/C of Section S1, at Ch. 94+830 - 95+170, Ch. 115+100 - 115+160 and Ch. 121+100 – 121+450 of Section S2**, a**t Ch. 167+1 00 ~ Ch. 167+650 of Section S3

Ch. 94+830 - 95+170,

Ag. Ilias I/C

Ch. 167+1 00 ~ Ch. 167+650

MAJOR EARTHWORKS in IONIA ODOS

EPS Embankment Construction at Ch. 100+300 ~ 100+500 and at Avgo I/J

Rockfall Fencing for existing National Road Protection Works at Klokova Tunnel area

MAJOR EARTHWORKS in CENTRAL GREECE

Ground Improvement for Foundation of Motorway with **Wick Drains and Long Term Preloading** at Xyniada area (Ch. 31+980 – 33+100)

MAJOR EARTHWORKS in CENTRAL GREECE

Ground Improvement for Foundation of Motorway with **Soil Reinforcement with Displacement Concrete Piles** at Xyniada area (Ch. 37+350 -37+700).

MAJOR EARTHWORKS in CENTRAL GREECE

Rehabilitation of **major area landslides** at the areas of Ch. 52+000, Ch. 54+000, 56+000.

MAJOR EARTHWORKS in CENTRAL GREECE

Bridges Foundations on Bored Piles

Ground Improvement for Foundation of Motorway with **Gravel Piles** at the area of Wastes Disposal at Ch. 108+500.

MAJOR TUNNELS in IONIA ODOS – NATM Method – Total Length 10,964.55m

Makyneia Tunnel: (Total Length of the two Bores 1,018.70 m)
Max Overburden Height = 50μ

MAJOR TUNNELS in IONIA ODOS – NATM Method – Total Length 10,964.55m

Klokova Tunnel: (Total Length of the two Bores 5,839.14 m)
Max Overburden Height = 535m
8 Escape Tunnels: 6 for Pedestrians and 2 for vehicles and Pedestrians).

MAJOR TUNNELS in IONIA ODOS – NATM Method – Total Length 10,964.55m

Kalydona Tunnel: (Total Length of the two Bores 2,461.08 m)

Max Overburden Height = 100m

2 Escape Tunnels for Pedestrians

MAJOR TUNNELS in IONIA ODOS – NATM Method – Total Length 10,964.55m

Ampelia Tunnel: (Total Length of the two Bores 1,645.63 m)
Max Overburden Height = 100m
2 Escape Tunnels for Pedestrians length 12,31m and 12,07m

MAJOR TUNNELS in CENTRAL GREECE – NATM Method – Total Length 6,950m

Tunnel T2 of Motorway length 2,983 m at Ch. 26+800

The Tunnel was Excavated about 1,000 m and was supported with additional measures to sustain for longer period till the Final Lining works will commence in the future.

Max Overburden Height = 270m

8 Escape Tunnels: (6 for Pedestrians and 2 for vehicles and Pedestrians)

MAJOR TUNNELS in CENTRAL GREECE – NATM Method – Total Length 6,950m

Tunnel T3A of Motorway length 113 m at Ch. 45+600
Max Overburden Height = 16m

MAJOR TUNNELS in CENTRAL GREECE – NATM Method – Total Length 6,950m

Tunnel T3 of Motorway length 387 m at Ch. 46+000
Max Overburden Height = 30m

MAJOR BRIDGES in IONIA ODOS

15 Bridges were built of length more than 50 m, with the majority been built in 2 separate Carriageways.

Their total length on the Motorway is approximately 2,600 m.

Their **Foundation** type varied:

- Surface Foundations on well enhanced foundation soil or sound rock
- Bored Piles of various depths
- Shafts replacing the Rockmass

The **Midpiers** were usually Constructed with sliding Formwork

The **Deck Superstructure** type of Construction also varied:

- Precast Prestressed Beams / precast slabs / cast in place slab concrete
- Prestressed Single Cell Box Girder (Kryfovo Bridge).
- Balance Cantilever Method (Evinos Bridge and Tsagaropoulo Bridge).

MAJOR BRIDGES in IONIA ODOS

1. Bridges with Deck on Precast Prestressed Beams

Makyneia Bridge at about Ch. 3+885, Length: Right Bore 2 Spans 33,75m+33,75m = 67,50m, Left Bore 3 Spans _ 33,75m+34,70m+33,75m = 102,20m, **Midpiers Maximum Height**: 22,0m

MAJOR BRIDGES in IONIA ODOS

1. Bridges with Deck on Precast Prestressed Beams

Menidi Bridge at Ch. 118+741,44 (the lengthiest Ionia Odos Bridge), Length 542m / 14 spans of lengths 1X35.50m - 12x39.00m -1X35.50m, **Midpiers Maximum Height: =** 34,53m at the M10R and M10L

MAJOR BRIDGES in IONIA ODOS

1. Bridges with Deck on Precast Prestressed Beams

Gymnotopos Bridge at Ch. 158+130, Length: 252.00 m / 7 spans of 36.00 m length each, **Midpiers Maximum Height**: = 21,50m

MAJOR BRIDGES in IONIA ODOS

2. Bridges with Deck Cast in Place Prestressed Single Cell Box Girder

Kryfovo Bridge at Ch. 183+435,00, Length: 280.0m / 6 spans 1X40.0m + 4 x 50.0m + 1X40.0m, **Midpiers Maximum Height:** = 38,21m

MAJOR BRIDGES in IONIA ODOS

3. Bridges with Balance Cantilever Deck Construction

Evinos Bridge at about Ch. 19+310, Length: 256m / 3 spans of lengths 68m+120m+68m, **Midpiers Maximum Height:** 22,84m.

MAJOR BRIDGES in IONIA ODOS

3. Bridges with Balance Cantilever Deck Construction

Tsagaropoulo Bridge at Ch 166+508 (The Highest Ionia Odos Bridge), Length: Left Carriageway 447.70m / 6 spans of lengths 36.0m+38.35m+94.5m+162.0m+94.5m+22.35m, Right Carriageway 425.35m / 5 spans of lengths 36.0m+38.35m+94.5m+162.0m+94.5m, **Midpiers Maximum Height**: 51,80m at the M3L

MAJOR BRIDGES in CENTRAL GREECE (E65)

8 Bridges were built of length more than 50 m, in 2 separate Carriageways.

Their total length on the Motorway is approximately 1,400 m.

Their Foundation type varied:

- Surface Foundations on well enhanced foundation soil or sound rock
- Bored Piles of various depths

The Midpiers were usually Constructed with sliding Formwork

The Deck Superstructure type of Construction was with Precast Prestressed Beams / precast slabs / cast in place slab concrete

MAJOR BRIDGES in CENTRAL GREECE

Bridges with Deck on Precast Prestressed Beams

Bridge Br50 at about Ch. 50+957, above the valley on the banks of Lake Smokovo, Length: 289.00 m / 8 spans, 35.00 m long prefabricated prestressed beams for the two outer spans and 36.50 m for the six middle spans, **Midpiers Maximum Height:** 26,19 m (M3R)

MAJOR BRIDGES in CENTRAL GREECE

Bridges with Deck on Precast Prestressed Beams

Bridge G028 at about Ch. 103+630 connecting the wide bed of River Pineios and roads KO32A and KO32 – The lengthiest Bridge of E65, Length: Right Branch 594.78 m - Left Branch 581.54 m / 16 spans each, **Midpiers Maximum Height:** 13,99 m (M6L)

Traffic Management System (TMS) and Tolls Collection Systems (TCS), together with the regular Motorway E/M Equipment and Installations

All Systems for critical functions are integrated through SCADA application, covering a broad spectrum of applications.

- Substations for power supply and distribution, each one fully equipped with MV switchgear, MV/LV transformers, LV switchgear, generators, UPS systems.
- Tunnel lighting.
- Fire detection and fire suppression.
- Ventilation (jet fans, sensor stations for measurements and regulation).
- Traffic lights in conjunction with digital signs (VMS, LCS, VSLS).

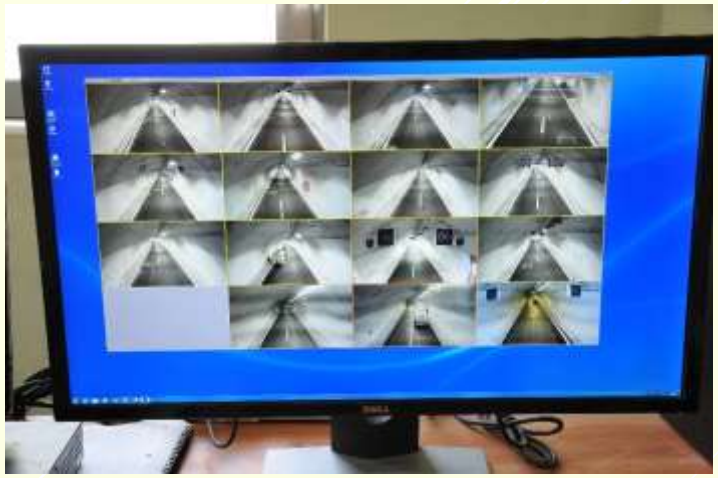
TUNNELS

Traffic Management System (TMS) and Tolls Collection Systems (TCS), together with the regular Motorway E/M Equipment and Installations

All Systems for critical functions are integrated through SCADA application, covering a broad spectrum of applications.

- Communication systems (radio and public services broadcasting).
- Traffic surveillance by means of CCTV.
- Automatic Incident Detection (AID).
- Traffic detection (loop blocks).
- Buttons for alarm in case of emergency and public address system with loudspeakers.
- Communication networks (local and backbone), main PLC stations.
- Ancillary devices (LEDs, emergency lighting in cross-passages).
- 1 Tunnel Service Building equipped with generator and UPS for power supply and distribution.

TUNNELS



Traffic Management System (TMS) and Tolls Collection Systems (TCS), together with the regular Motorway E/M Equipment and Installations

All Systems for critical functions are integrated through SCADA application, covering a broad spectrum of applications.

OPEN CARRIAGEWAY

- Lighting of I/C, MSS and tunnel approach zones, local junctions and lay-bys
- Lighting of Frontal Toll Stations and Lateral Tolls.
- Lighting of Underpasses.
- Irrigation network (including of manholes for hydraulic fixtures or hydrants, pumping stations and automation - controlling supervisory digital software).

Traffic Management System (TMS) and Tolls Collection Systems (TCS), together with the regular Motorway E/M Equipment and Installations

All Systems for critical functions are integrated through SCADA application, covering a broad spectrum of applications.

OPEN CARRIAGEWAY

- Traffic management by means of VMS.
- Traffic surveillance by means of CCTV.
- Over height vehicle detectors along with message over height signs with traffic lights.
- Weather Stations.
- Communication networks (backbone), local plc stations.
- Traffic detection (loop blocks)

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SPECIALISTS IN MAJOR MOTORWAY PROJECTS

conclusions

Consulting in all Fields of Engineering Projects - High Level Engineering Services

- Specializing in providing solutions for complex Field Civil Engineering problems, related to Site **Geotechnical aspects** requiring emergency and/or additional supporting measures, **Tunnels** requiring daily monitoring and appraisal decisions, consulting in **Major Bridges of all Types of Construction Methods**,
- Specializing and Pioneering in promoting Modern Specifications implementation for **Alignment Designs, Pavement Design and Construction, Road Safety Systems, Safety Barriers (EN1317).**
- Specializing in providing solutions for Advanced Intelligence Systems for **Traffic Management System (TMS)** and **Tolls Collection Systems (TCS),** together with the regular **Motorway E/M Equipment and Installations.**

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Consulting in all Fields of Engineering Projects - High Level Engineering Services

OMEK in all years has invested in having High Level of Education and Experienced Engineers, specializing on all above subjects. All of them are available to offer their expertise, upgrading the level of Consultancy Services in all Fields of Engineering.

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Many thanks for your attention