

Highway Tunnel

Agia Triada Tunnel

Egnatia Highway, Section 4.1.1.s

Northern Greece

Project

Highway Tunnel

Construction Cost

Total cost: approx. € 9 m.

Project Schedule

Design: 2007
Construction: 2007-2008

Project Description

Twin bore highway tunnel
Length: 2 x 350m
Excavation cross section: 105m²

Excavation Method

NATM – Mechanical means and spot drill & blast

Final Lining

Reinforced concrete C20/25

Geology

Siltstones, sandstones, conglomerates
Maximum overburden: 20m

Our Services

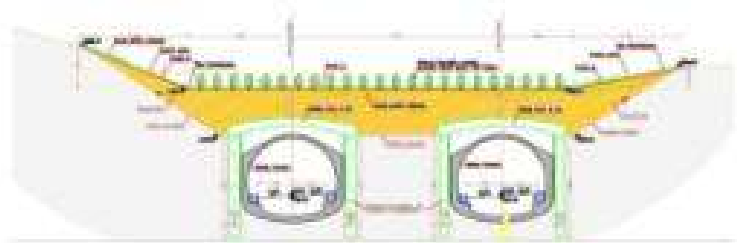
- Detailed geotechnical & structural design
- Detailed geotechnical & structural design of portals

Construction Details

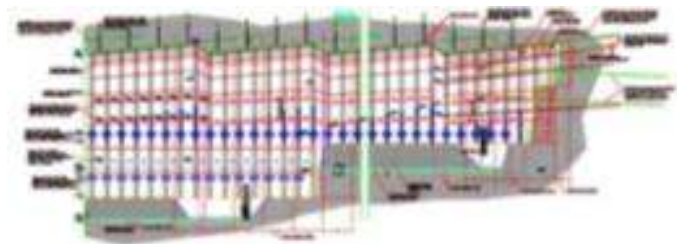
- Use of forepoles
- Extended face support

Client

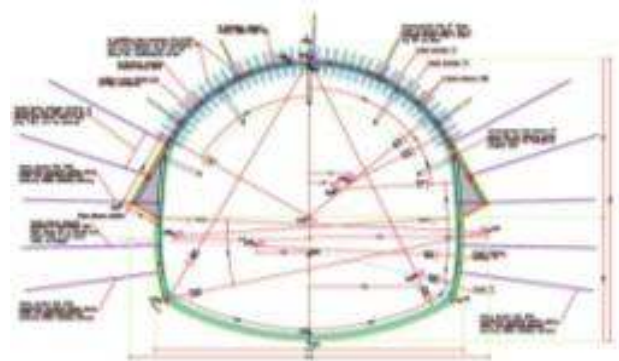
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Backfilling cross section of entrance portals



Longitudinal section of excavation and primary support of class F1



Typical cross section of excavation and primary support of class F1

Highway Tunnel

Dorkada Tunnel

Highway Axis: Thessaloniki - Serres Promachonas,

Section 60.1.2

Northern Greece

Project

Highway Tunnel

Construction Cost

Total cost: approx. € 12 m.

Project Schedule

Design: 2005
Construction: 2005-2008

Project Description

Twin bore highway tunnel
Length: 2 x 480m
Excavation cross section: 105m²

Excavation Method

NATM – Mechanical excavation, drilling & blasting

Final Lining

Reinforced concrete C20/25

Geology

Gneisses, pegmatites, aplitic veins
Maximum overburden: 30m

Our Services

- Detailed geotechnical & structural design
- Detailed geotechnical & structural design of tunnel's portals

Construction Details

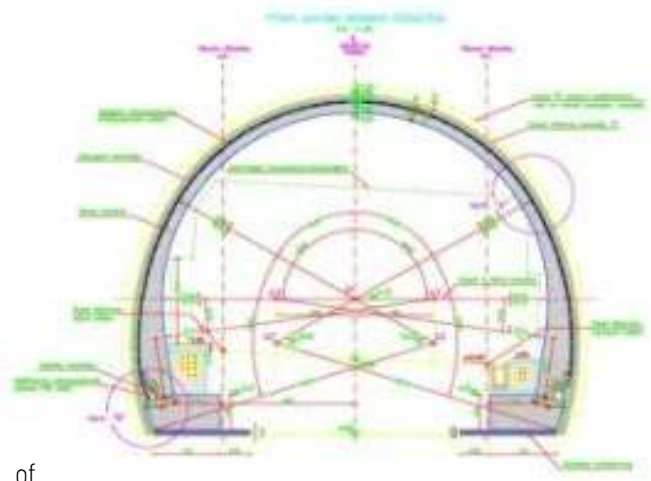
- Construction of Elephant foot
- Extended face support

Client

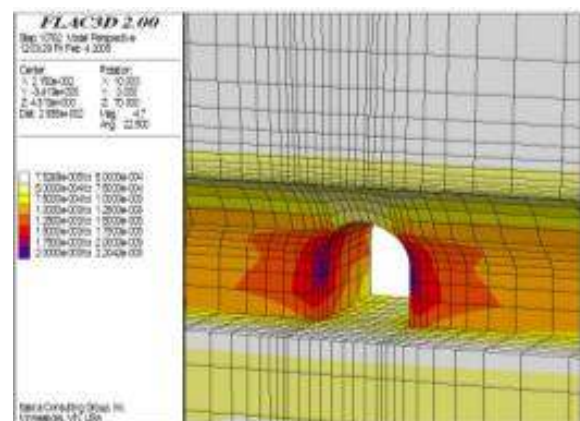
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View of portals



Typical cross section of final lining



3D distribution of stresses model

Highway Tunnel

Panagia Tunnel

Egnatia Highway, Section 4.1.1s

Northern Greece

Project

Highway Tunnel

Construction Cost

Total cost: approx. € 84,25 m.

Project Schedule

Design: 2003-2005

Construction: 2006-2008

Project Description

Twin-bore highway tunnel

Total length: 2 x 2670m

Cross Section: 105m²

Driving Method

NATM – Mechanical excavation, drilling & blasting

Final Lining

Reinforced concrete C20/25

Geology

Siltstones, sandstones, peridotites, cherts, gabbro, schists, red pelites, tectonic melange

Max. overburden: 250m

Our Services

- Detailed design of excavation, primary support and final lining, including all relevant works (portals, niches, lay-bys, cross passages, hydraulic arrangements)
- Supervision of geotechnical surveys and geotechnical evaluation along the two tunnel bores
- Elaboration of tender documents
- The designs were jointly elaborated by OMIKRON KAPPA CONSULTING & EDR GmbH, Munich

Construction Details

- Closed-ring solutions
- Stiffened primary support shell
- Design of the entrance portals with the Cover & Cut method, due to existing surface failures

Client

EGNATIA ODOS S.A.



Entrance portals



Exit portal of the right bore

Highway Tunnel

Agios Nikolaos Tunnel

Egnatia Highway, Section 3.3

Northern Greece

Project

Highway tunnel

Construction Cost

Total cost: approx. € 14,6 m.

Project Schedule

Design: 2000-2003

Construction: 2001-2006

Project Description

Twin bore highway tunnel

Total length: 2 x 241m

Cross section: 105m²

Method of tunnel excavation

NATM – drilling and blasting with occasionally mechanical excavation

Final Lining

Reinforced concrete C20/25

Geology

Flysch formation consisting mainly of thick bedded sandstones, intercalations of thin bedded siltstones & thin bedded sandstones and very soft shales
Major water inflows

Max. overburden: 60m

Our Services

- Detailed geotechnical & structural design
- Supervision of construction

Construction Details

- Use of forepoles and spiles
- Special drainage measures

Client

EGNATIA ODOS S.A.



Entrance portals



Excavated tunnel



Entrance Portals Cut&Covers

Highway Tunnel

Kalamion Tunnel

Egnatia Highway, Section 3.2

Northern Greece

Project

Highway tunnel

Construction Cost

Total cost: approx. € 23,5 m.

Project Schedule

Design: 2000-2002
Construction: 2001-2005

Project Description

Twin bore highway tunnel
Total length: 2 x 783m
Cross section: 105 -150m²



Exit portals

Method of tunnel excavation

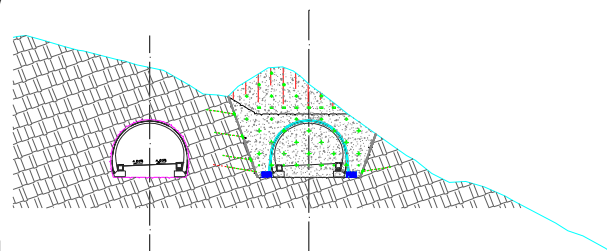
NATM – drilling and blasting with occasionally mechanical excavation

Final Lining

Reinforced concrete C20/25

Geology

Flysch formation consisting mainly of thick bedded sandstones Intercalations of thin bedded siltstones & sandstones and soft shales
Major water inflows
Max. overburden: 95m



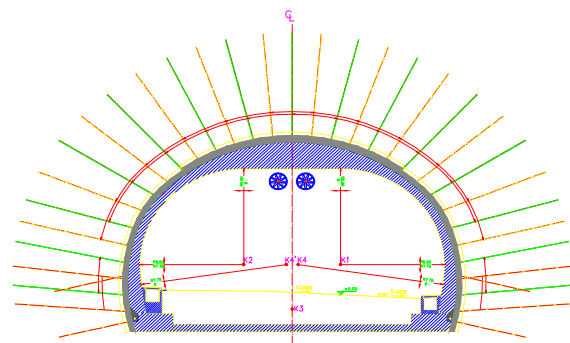
Design of entrance portals

Our Services

Detailed geotechnical & structural design

Client

EGNATIA ODOS S.A.



Tunnel cross section in the 3-lane part

Highway Tunnel Anilio Tunnel Egnatia Highway, Section 3.3 Northern Greece

Project

Highway tunnel

Construction Cost

Total cost: approx. € 88 m.

Project Schedule

Design: 2001-2003

Construction: 2001-2006

Project Description

Twin bore highway tunnel

Total length: 2 x 1917m

Cross section: 105m²

Method of tunnel excavation

NATM – Mechanical excavation, drilling & blasting

Final Lining

Reinforced concrete C20/25

Geology

Flysh formation consisting of sandstones and weak siltstones

Chaotic melange consisting mainly of weak and soft siltstones

Max. overburden: 250m

Our Services

- Detailed geotechnical & structural design
- Supervision of construction

Construction Details

- Flexible support by use of lattice girders with sliding joints in the highly squeezing parts of tunnel
- “Closed ring” solutions

Clients

- SOTIROPOULOS & ASSOCIATES S.A.
- AKTOR S.A.



Entrance portals



Exit Portals



Tunnel with final lining

Highway Tunnel

Anthochori Tunnel

Egnatia Highway, Section 3.2

Northern Greece

Project

Highway tunnel

Construction Cost

Total cost: approx. € 14,6 m.

Project Schedule

Design: 2001-2003

Construction: 2001-2005

Project Description

Twin bore highway tunnel

Total length: 2 x 673m

Cross section: 105m²

Driving Method

NATM – Mechanical excavation with occasional drilling and blasting

Final Lining

Reinforced concrete C20/25 and C30/37

Geology

Very weak tectonically deformed silty or clayey shale forming a chaotic structure
Thin layers of sandstones and siltstones, transformed into small rock pieces
Max. overburden: 90m

Our Services

- Detailed design of rehabilitation measures
- Redesign of the excavation, primary support & final lining
- Actual monitoring evaluation
- Supervision during construction

Construction Details

- Demolition and rehabilitation of the highly deformed existing support shell
- Intermediate lining

Client

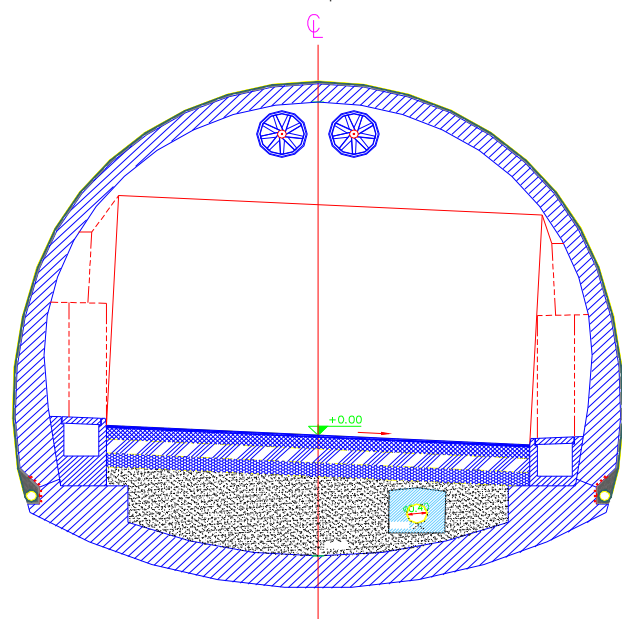
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Exit portals



Entrance portals



Typical cross section

Highway Tunnel

Driskos Tunnel

Egnatia Highway, Section 2.3

Northern Greece

Project

- Highway tunnel
- Ventilation shaft

Construction Cost

Total cost: approx. € 129 m.

Project Schedule

Design: 1999-2001
Construction: 1999-2005

Project Description

- Twin bore highway tunnel
- Total length: 2 x 4500m
- Cross section: 105m²
- Ventilation shaft
- Height: 186m
- Cross section: 22.4m²

Method of tunnel excavation

NATM – drilling and blasting, mechanical excavation

Final Lining

Reinforced concrete C20/25

Method of shaft excavation

Top down construction except the last meters which will be excavated through the tunnel

Geology

Alterations of sandstones and siltstones with shear zones and faults
Max. overburden: 230m

Our Services

- Detailed geotechnical & structural design
- Detailed geotechnical & structural design for the ventilation shaft

Construction Details

- Consolidation grouting
- Prestressed anchors

Clients

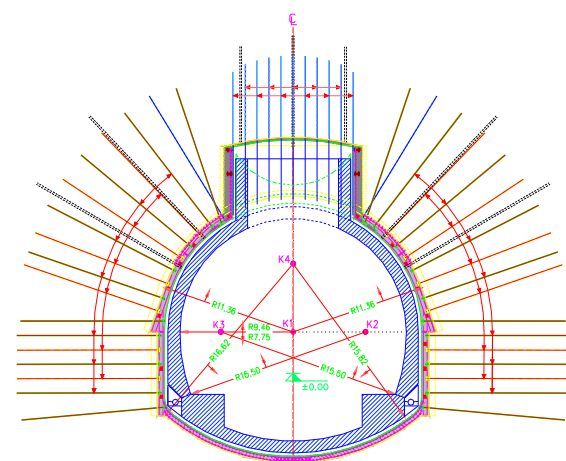
- AKTOR S.A.
- EGNATIA ODOS S.A.



Entrance portals



Driskos twin bore highway tunnel during a phase excavation



Tunnel cross section in the position of the ventilation shaft

Technical Works for Highway Tunnels

Smoke Extraction Shaft for Driskos Twin Bore Highway Tunnel

Egnatia Highway, Section 2.3

Northern Greece

Project

Smoke Extraction Shaft for Driskos Twin Bore Highway Tunnel

Construction Cost

Total cost: approx. € 6 m.

Project Schedule

Design: 2003 - 2009

Construction: 2006 - 2011

Project Description

Smoke extraction shaft

Height: 190m

Effective cross section: 19.5m²

Max. excavation cross section: 34.8m²

Final Lining

Reinforced concrete C20/25

Method of shaft excavation

Conventional descending sequential excavation and primary support with hoisting of the excavated material (shaft sinking) and ascending final lining

Geology

Alterations of sandstones and siltstones with shear zones and faults

Internal shear sliding and failure

Max. depth: 190m

Our Services

- Detailed geotechnical & structural design
- Special designs for the investigation / detection of the failure zone
- Design of special measures for passing through the failure zone

Construction Details

- Consolidation grouting
- Water isolation grouting to minimize water inflows
- Shear keys
- Forepoles

Client

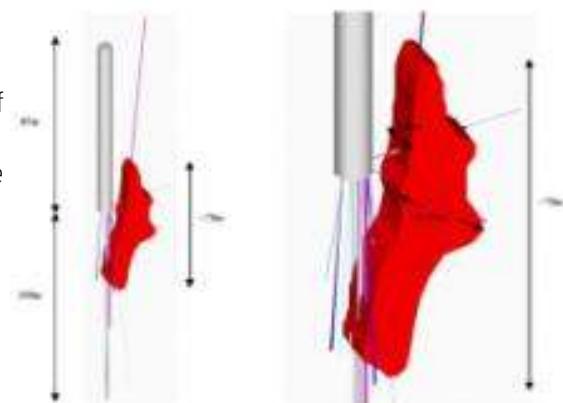
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View of the smoke extraction shaft



Hoisting system



Estimated failure zone

Highway Tunnels

S1 & S2 Tunnels

Egnatia Highway, Section 1.1.6

Northern Greece

Project
Highway tunnel

Construction Cost
Total cost: approx. € 29,3 m.

Project Schedule
Design: 2000-2002
Construction: 2000-2006

Project Description
Twin bore highway tunnels
Total length: 3108m
Cross section: 105m²

Method of tunnel excavation
NATM – drilling and blasting with occasionally mechanical excavation

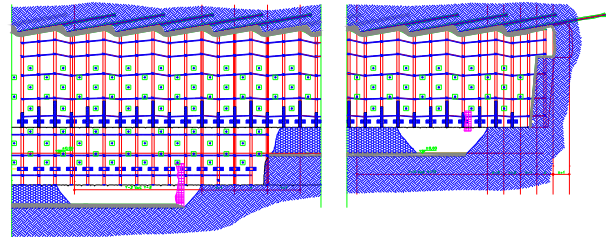
Final Lining
Reinforced concrete C20/25

Geology
Limestones highly brecciated
Cataclastic limestones
Evaporites
Major fault zone
Max. overburden: 120m

Our Services
- Detailed geotechnical design
- Supervision of construction

Construction Details
- Use of forepoles and spiles
- Grouted piles as face control

Client
PANTECHNIKI S.A.



Longitudinal section of primary support class with forepoles



S1 tunnel



S2 tunnel

Highway Tunnel

S4 Tunnel

Egnatia Highway, Section 5.2

Northern Greece

Project

Highway tunnel

Construction Cost

Total cost: approx. € 13,2 m

Project Schedule

Design: 1998-2001

Construction: 2000-2003

Project Description

Twin bore two highway tunnel

Total length: 2 x 272m

Cross section: 105m²

Method of tunnel excavation

NATM – Mechanical excavation

Final Lining

Reinforced concrete C20/25

Geology

Thin bedded marbles, gneisses and highly weathered schists with chaotic structure

Max. overburden: 50m

Our Services

- Detailed geotechnical & structural design
- Redesign of entrance portal due to major active landslide

Construction Details

- Forepoling umbrellas in both top-heading and bench
- Extensive face support
- Very stiff temporary support shell

Client

EGNATIA ODOS S.A.



Exit portals



Final lining construction works



Entrance portals

Highway Tunnel

S3 Tunnel

Egnatia Highway, Section 5.2-5.3

Northern Greece

Project

Highway tunnel

Construction Cost

Total cost: approx. € 88.1 m.

Project Schedule

Design: 2000-2004

Construction: 1999-2005

Project Description

Twin bore highway tunnel

Total length: 2 x 230m

Cross section: 105m²

Method of tunnel excavation

NATM – mechanical excavation

Final Lining

Reinforced concrete C20/25

Geology

Phyllites limestones and soil materials in an active landslide area

Max. overburden: 35m

Our Services

- General geotechnical & structural design
- Design of rehabilitation and stabilization measures in a transnationally moving tunnel
- Structural design jointly elaborated by OMIKRON KAPPA CONSULTING & EDR GmbH, Munich

Construction Details

- Concrete anchored pile wall
- Prestressed permanent anchors applied from inside the tunnel at the area of the cracked invert
- Cement consolidation grouting applied from inside the tunnel

Client

AEGEK S.A.



Entrance portals



Tunnel fully excavated



Tunnel with final lining

Highway Tunnels

S1 & S2 Tunnels

Egnatia Highway, Section 5.2-5.3

Northern Greece

Project

Highway tunnel

Construction Cost

Total cost: approx. € 82.2 m.

Project Schedule

Design: 1999-2001

Construction: 1999-2003

Project Description

Twin bore highway tunnels

Total length: 2x840 & 2x315m

Cross section: 105m²

Method of tunnel excavation

NATM – Drilling and blasting, mechanical excavation

Final Lining

Reinforced concrete C20/25

Geology

Phyllites, sandstones

Ground water

Max. overburden: 120m

Our Services

- Detailed geotechnical & structural design
- Structural design jointly elaborated by OMIKRON KAPPA CONSULTING & EDR GmbH, Munich

Construction Details

- Face support with spiles
- Special drainage and bolting technique

Client

AKTOR S.A.



Cut & Cover entrance portals of S1 tunnel



S2 exit portals



Construction of final lining in S1 tunnel

Highway Tunnel

S2.1 Tunnel

Egnatia Highway, Section 5.2-5.3

Northern Greece

Project

Highway tunnel

Construction Cost

Total cost: approx. € 5 m.

Project Schedule

Design: 2001-2002

Construction: 2002-2005

Project Description

Twin bore highway tunnel

Total length: 2 x 287m

Cross section: 105m²

Method of tunnel excavation

NATM – Drilling and blasting, mechanical excavation

Final Lining

Reinforced concrete C20/25

Geology

Phyllites, sandstones

Max. overburden: 25m

Our Services

- Detailed geotechnical & structural design
- Structural design jointly elaborated by OMIKRON KAPPA CONSULTING & EDR GmbH, Munich

Client

AKTOR S.A.



Construction works for the landscape rehabilitation of the entrance portals



Entrance Portals

Highway Tunnel

Nestos Tunnel

Egnatia Highway, Sections 14.1.2 – 14.2.1

Northern Greece

Project

Highway tunnel

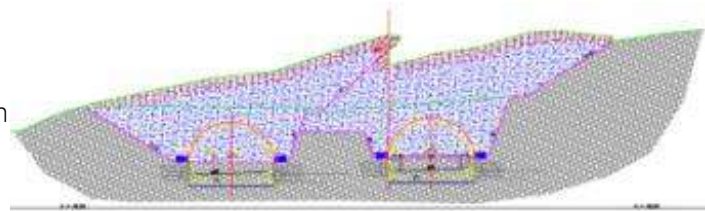
Construction Cost

Total cost: approx. € 6 m

Project Schedule

Design: 2001-2002

Construction: 2006-2007



Exit portal excavations works

Project Description

Twin-bore highway tunnel

Total length: 2 x 310m

Cross section: 105m²

Driving Method

NATM – Mechanical excavation, drilling & blasting

Final Lining

Reinforced concrete C20/25

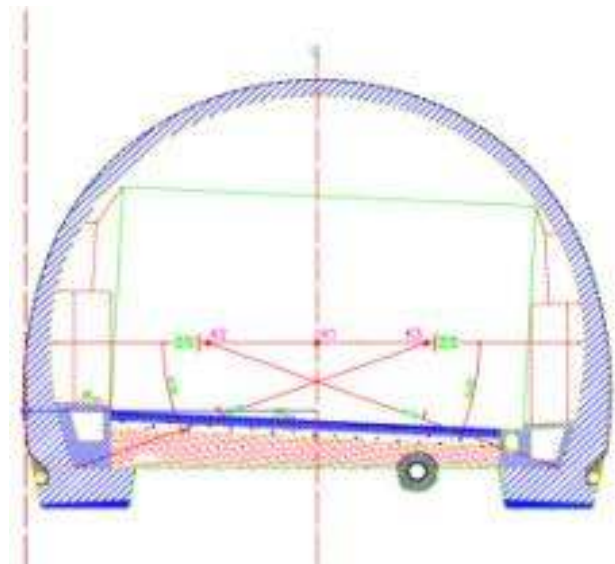
Geology

Marbles, schists, gneisses

Max. overburden: 40m

Our Services

- Detailed design of excavation, primary support and final lining, including all relevant works (portals, niches)
- Design of hydraulic arrangements
- Design of landscape rehabilitation in the tunnel's portals



Typical tunnel cross section

Client

EGNATIA ODOS S.A.

Cut & Cover

Landscape Rehabilitation of Tunnels portals

Greece

Project

Cut & Cover structures for the landscape rehabilitation of tunnels portals

Construction Cost

Total cost: approx. € 1-4 m.

Project Schedule

Design: 2000 - 2005

Construction: 2000 - 2005

Project Description

Cut & Cover

Total Length: 5 - 120m

Cross section of horseshoe type

Geology

Schists, limestones

Weak overthrust materials, sandstones

Siltstones

Groundwater

Our Services

- Detailed geotechnical & structural design
- Designs jointly elaborated by OMIKRON KAPPA CONSULTING & EDR GmbH, Munich

Clients

- EGNATIA ODOS S.A.
- AKTOR S.A.
- AEGEK S.A.
- EFKLIDIS S.A.
- J&P-AVAX(HELLAS) S.A.



AS1 tunnel entrance portal structure / cut & cover (Highway PATHE, Kakia Skala section)



S1 tunnel entrance portal cut & cover (Egnatia Odos, section 5.2-5.3)



Agios Nikolaos entrance portals cut & cover structures (Egnatia Odos, section 3.3)

Highway Bridges

G1 & G2 Bridges

Egnatia Highway, Section 5.2-5.3

Northern Greece

Project

Highway bridges

Construction Cost

Total cost: approx. € 6 m.

Project Schedule

Design: 2001-2004

Construction: 2001-2004

Project Description

Twin bridges with central piers

Total length: 120 & 165m

Maximum span: 80m

Maximum pier height: 55m

Construction Method

- Foundation of the piers with retaining structures consisting of Berlin walls and anchored pile walls
- Foundation of the central piers in shafts with \varnothing 12m and depth 22m

Geology

Phyllites

Our Services

Detailed design of the retaining structures as well as the foundation design of the piers and the abutments

Construction Details

- Geobrigg fences were installed to prevent loose material movement
- Stiff support shell applied to the foundation shafts

Client

AKTOR S.A.



G1 Bridge central pier foundation shaft



G1 bridge central pier foundation shaft retaining structure



G2 Bridge

Highway Embankment High Embankment of Metsovo Interchange Egnatia Highway, Section 3.2

Northern Greece

Project

Highway embankment

Construction Cost

Total cost: approx. € 1.0 m.

Project Schedule

Design: 2000

Construction: 2002-2005

Project Description

Reinforced embankment with gabions combined with geogrids

Modulation geometry:

- Modulation of reinforced slopes with gradient 2:1 & 1:1
 - All other slopes were modulated with gradient 1:2
- Length: 110m
Max. width: 90m
Max. height: 50m

Geology

Flysch formation consisting of thick – bedded sandstones and red pelites

Our Services

- Detailed geotechnical design
- Construction drawings

Construction Details

- Construction of the embankment with use of sandstone material
- Strength of geogrids 400KNm
- Gabions dimensions 1m x 1m x 2m & 1m x 0,5m x 2m
- Length of the reinforcement bars 20m & 25m

Client

EGNATIA ODOS S.A.



Western view of the embankment



South view of the embankment



Reinforced earth in the upper slope

Highway Embankment G3 Embankment Egnatia Highway, Section 5.2-5.3 Northern Greece

Project

Highway embankment

Construction Cost

Total cost: approx. € 0,6 m.

Project Schedule

Design: 2001

Construction: 2002-2003

Project Description

Reinforced embankment with geotextiles

Modulation geometry:

- Slopes with gradient 2:3 in the lower 25m
- Slopes with gradient 1:1 with benches per 10m of slope height, up to the embankment crest

Length: 140m

Width: 50m

Max. height: 70m

Geology

Phyllites, sandstones, schists

Our Services

- Detailed geotechnical design
- Construction drawings

Construction Details

- Placement of reinforced earth in the upper three slopes of the embankment
- Maximum length of geotextiles 50m
- Placement of geotextiles per 0.5m up to 1,0m

Client

AEGEK S.A.



View of the embankment during the construction phase



Downstream view of the embankment after the completion of works



Upstream view of the embankment after the completion of works

Highway Embankment Travertine Embankment Egnatia Highway, Section 5.2-5.3 Northern Greece

Project

Highway embankment

Construction Cost

Total cost: approx. € 0,4 m.

Project Schedule

Design: 2000

Construction: 2000 -2002

Project Description

Reinforced embankment with pre-constructed elements

Modulation Geometry:

Slopes with gradient 2:3

Vertical slope of reinforced earth with height 10m

Length: 180m

Width: 30m

Max height: 38m

Geology

Travertine, loose soil materials

Our Services

- Detailed geotechnical design
- Construction drawings

Construction Details

- Embankment construction with travertine materials
- Use of reinforced earth of VSL type constituted of steel bars and pre-constructed concrete elements
- Reinforced earth length 10m
- Placement of reinforcements per 75cm

Client

AKTOR S.A.



Embankment view during construction



Embankment view after construction

Highway Embankment Asomaton Embankment Egnatia Highway, Section 5.2-5.3 Northern Greece

Project

Highway embankment

Construction Cost

Total cost: approx. € 1 m.

Project Schedule

Design: 2003

Construction: 2003 -2004

Project Description

Two-sided soil embankment for the replacement of a previous – failed embankment

Modulation geometry:

One slope with gradient 1:3 (upstream section) and with gradient 2:3 (downstream section)

Length: 90m

Width: 27m

Max. height: 25m

Geology

Travertine, peridotite, loose soil materials, groundwater flows

Our Services

- Detailed geotechnical design
- Final geological and hydrogeological design
- Evaluation of previous failure
- Design of foundation works for the new embankment
- Design and support of the new embankment

Construction Details

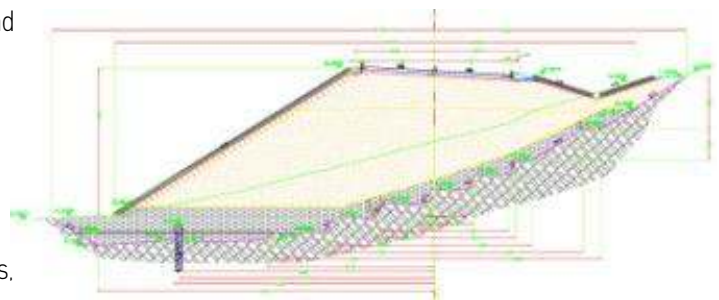
- Embankment foundation in one row of piles $\varnothing 1,00/1,30$, with 16m length combined with cap beam, in the area of the failure surface
- Construction of a riprap layer of thickness 1,5m in the embankment base for the drainage of the groundwater

Client

AKTOR S.A.



View of the embankment failure



Typical cross section after the failure rehabilitation

Highway Embankment G6 Embankment Egnatia Highway, Section 5.2-5.3 Northern Greece

Project

Highway embankment

Construction Cost

Total cost: approx. € 0.15 m.

Project Schedule

Design: 2000

Construction: 2001-2002

Project Description

Rock fill embankment

Modulation Geometry

Slopes with gradient 2:3 of maximum height 20m with intermediate bench with 4m width

Length: 141m

Width: 40m

Max. height: 50m

Geology

Alterations of gneisses and mica schists

Our Services

- Detailed geotechnical design
- Construction drawings

Client

AEGEK S.A.



Downstream view of the embankment

Excavation Works

Metsovo Connecting Road Egnatia Highway, Section 3.2 – 3.3

Northern Greece

Project

Highway general excavation works

Construction Cost

Total cost: approx. € 1,5 m.

Project Schedule

Design: 2000 - 2001

Construction: 2003 - 2005

Project Description

Permanent one-sided and two-sided slopes with support measures and retaining walls, according to the stability conditions

Max. length: 430m

Max. height: 11m - 40m

Geology

Flysch formation consisting of thick – bedded sandstones, siltstones and red pelites

Our Services

Detailed geotechnical & structural design

Construction Details

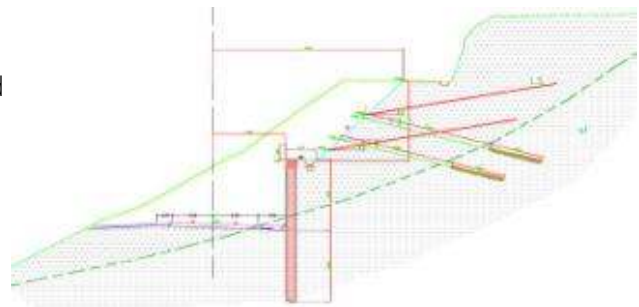
- Design of special rockfall protection barriers
- Installation of prestressed anchors and special grids for the protection of the slopes against corrosion
- Design of retaining walls and pile walls

Client

EGNATIA ODOS S.A.



Installation of rock bolts and special grids for the slope protection against corrosion



Typical excavation cross section

Excavation Works

Egnatia Highway, Section 5.2 – 5.3

Northern Greece

Project

General excavation works for the foundation of bridges

Construction Cost

Total cost: approx. € 0,3 m.

Project Schedule

Design: 2002

Construction: 2002

Project Description

Modulation of slopes of height up to 15m

Geology

Blocky phyllites, sandstones and limestones

Our Services

Detailed geotechnical design of excavation and support

Construction Details

- Installation of prestressed anchors
- Installation of geobrigg TECCO grids for the protection against corrosion of the slopes and to prevent loose material movement

Client

AKTOR S.A.



Excavated slopes in the area of the foundation of G1 bridge



Geobrigg TECCO type grids installation works

Embankments

Egnatia Highway, Section 5.2-5.3

Northern Greece

Project

Highway embankments

Construction Cost

Total cost: approx. € from 0,15 to 0,6 m.

Project Schedule

Design: 2001-2002

Construction: 2000-2003

Project Description

Embankments constructed with rock fill or reinforced with geotextiles, geogrids and preconstructed elements

Maximum heights: 30-70m

Geology

Phyllites, travertine, sandstones

Our Services

Detailed geotechnical design

Clients

- AKTOR S.A.

- AEGEK S.A.



G6 rock fill embankment, maximum height 50m



G3 reinforced embankment, maximum height 70m



Reinforced earth embankment constructed with travertine materials and preconstructed reinforced elements, maximum height 38m

Special Geotechnical Applications

Jet Grouting Diaphragm Wall

Egnatia Highway, Section 2.4 – 3.1

Northern Greece

Project

Jet grouting diaphragm wall, for the reduction of water inflows in order to construct the foundations of M2 to M6 piers of T10 bridge at Metsovitikos River

Construction Cost

Total cost: approx. € 6 m.

Project Schedule

Design: 2007
Construction: 2007-2008

Project Description

- Jet grouting diaphragmatic wall with secant ground piles
- Central diaphragm wall, with 3 rows ground piles
- 4 additional diaphragm walls at the foundation areas of the piers
- Diameter: Ø 80. Length 10m-20m
- Total walls length: 365m

Geology

- Riverbed deposits (sands, breccia argillaceous materials)
- Conglomerates with high permeability
- High river flood discharge
- High groundwater table

Our Services

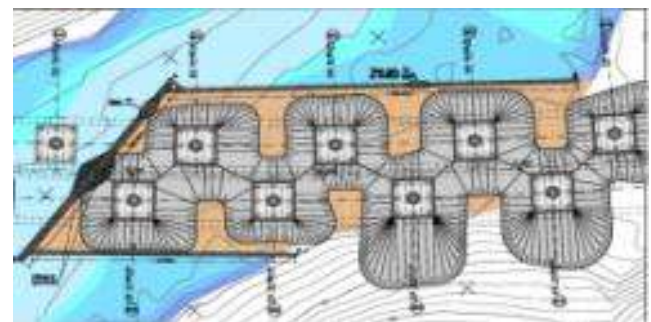
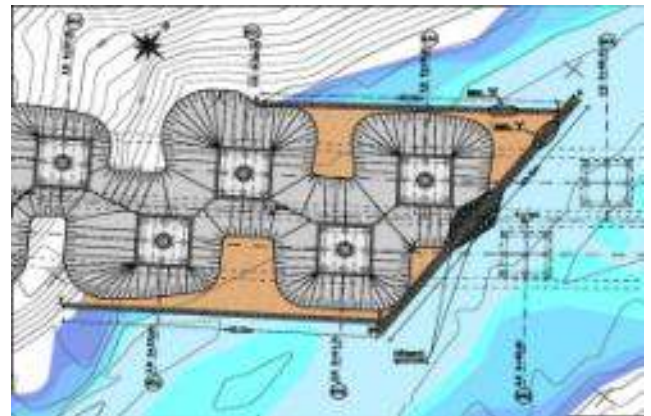
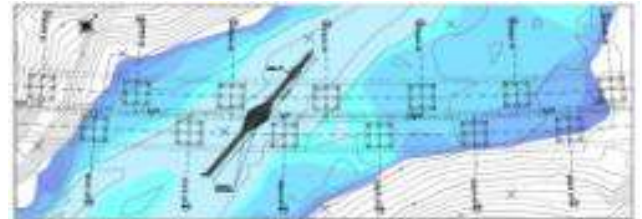
Detailed geotechnical design

Construction Details

- Dam construction for the arrangement of the riverbed
- Rip - rap construction for the protection of the main diaphragm wall

Client

AKTOR S.A.



Jet grouting construction stages

Hydraulic Tunnel

Kostarakos Hydraulic Diversion Tunnel

Egnatia Highway, Section 3.3 – 3.5.1

Northern Greece

Project

Hydraulic tunnel

Construction cost

Total cost: approx. € 2.2 m.

Project Schedule

Design: 2006 - 2007

Construction: 2007

Project Description

Hydraulic diversion tunnel of Kostarakos stream

Length: 310m

Maximum overburden: 45m

Effective cross section: 19.8m²

Excavation Method

NATM – Drilling & blasting and mechanical means

Final Lining

Reinforced concrete C20/25 in tunnel's sides

Gunitite C25/30 in crown section

Geology

Peridotites, serpentized peridotites, serpentinites, tectonic melange

Our Services

- Detailed geological – geotechnical design
- Detailed geotechnical & structural design of tunnel and portals

Construction Details

- Use of forepoles and spiles
- Stiff temporary support by using steel sets of HEB type
- Support by use of anchors and shotcrete
- Closed ring solutions

Client

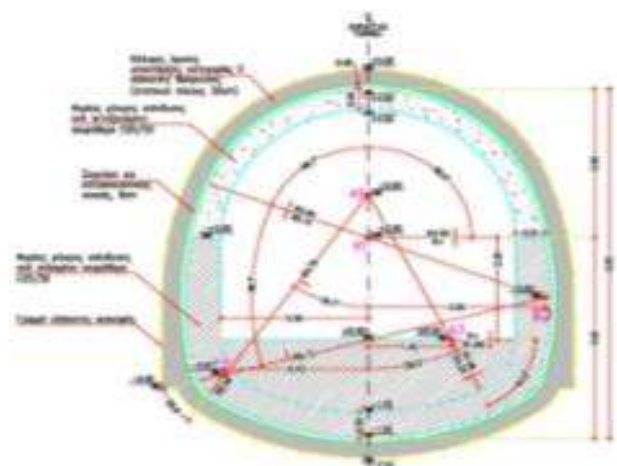
AKTOR S.A.



Entrance portal general view



Peridotites – serpentized peridotites



Final lining typical cross section

Hydraulic Tunnel

Hydraulic Drainage Tunnel for the stabilization of the landslide in the Big Cut area

Egnatia Highway, Section 3.3 – 3.5.1

Northern Greece

Project

Hydraulic tunnel

Construction cost

Total cost: approx. € 3 m.

Project Schedule

Design: 2008

Construction: 2008

Project Description

Hydraulic drainage tunnel for the stabilization of the landslide in the Big Cut area

Length: 520m

Maximum overburden: 100m

Effective cross section: 19.8m²

Excavation Method

NATM – Mechanical means

Final Lining

Reinforced concrete C20/25

Geology

Peridotites, serpentized peridotites, serpentinites, tectonic melange

Our Services

Detailed geotechnical & structural of the tunnel and portals

Construction Details

- Use of steel sets of HEB type
- Use of anchors and shotcrete
- Micropiles for shotcrete shell's foundation improvement
- Closed ring solutions

Client

AKTOR S.A.



Hydraulic drainage tunnel entrance portal



Excavated tunnel



Excavation and primary support Cross section