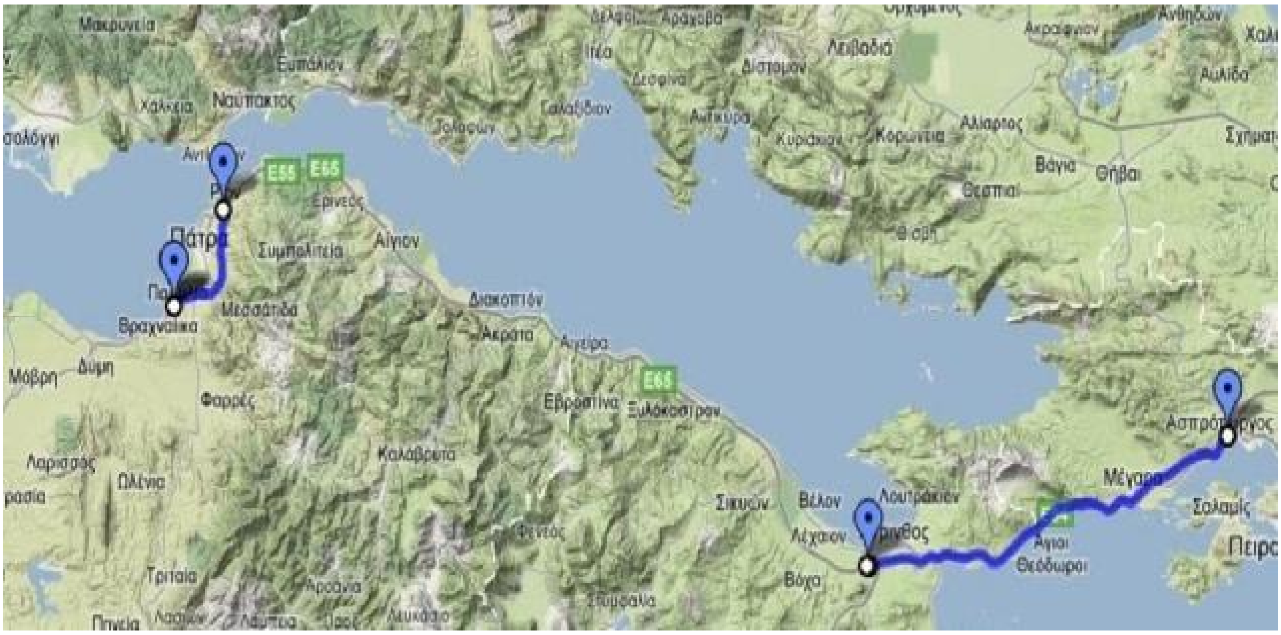
APION KLEOS J/V

EXISTING SECTIONS of OLYMPIA ODOS:
ELEFSINA - KORINTHOS & PATRA BYPAS

PAVEMENT MANAGEMENT SYSTEM



REPORT

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TERMINOLOGY

AADT:	Annual average daily traffic -the total volume of vehicle traffic
B/C:	Benefit to Cost ratio
CJV:	Construction joint venture
ELKO:	Elefsina – Korinthos, right branch with direction to Korinthos
ESAL:	Equivalent standard axle load
GIS:	Geographic Information System
I/C:	Interchange
IRI:	International roughness index
J/V:	Joint Venture
KOEL:	Elefsina – Korinthos, left branch with direction to Elefsina
PBKO:	Patra's bypass, left branch with direction to Korinthos
PBPY:	Patra's bypass, right branch with direction to Pyrgos
PMS:	Pavement management system

PROJECT DATA

Concession Company:	OLYMPIA ODOS S.A.
Operator:	OLYMPIA ODOS OPERATION S.A.
Constructor:	APION KLEOS CONSTRUCTION JOINT VENTURE

OLYMPIA ODOS PROJECT OVERVIEW

Olympia Odos is the largest and most difficult project of the ambitious infrastructure development program named “Roads of Development”. This program was initiated by the Greek State, aiming at introducing modern and European-standard infrastructure projects throughout Greece and at creating real opportunities of development and progress.

Olympia Odos is among the most important national projects and has great strategic significance for the development not only of Peloponnesus but also of Western Greece and Epirus, both connected through the Rion-Antirrion Bridge, and also for the development of the capital of Greece, Athens. This development will because all of these areas will be connected with the port of Patra, one of the most important gates to and from Europe. Additionally this new motorway will create a more direct and safe route between the towns of Elefsina and Tsakona, thus improving the overall mobility in the South-western part of Greece, reducing time travel supporting business activity in the region of Peloponnesus.

Olympia Odos is a 30-year Concession project, in which the Greek state participates with limited funding. This project is mostly funded by private investments of strong Greek and European partners. Those partners have a long and proven record in delivering high-quality and cost-efficient infrastructure projects, as well as providing high-level operational services. Olympia Odos S.A. will operate the 365 km motorway for 30 years and will use mainly toll revenues to return the investment to private lenders.

The northern part of the motorway is actually the first section of the PATHE motorway, linking Athens to Patra, the third largest city of Greece. The southern part of the motorway runs along the western coast of the Peloponnesian peninsula between the cities of Patra, Pyrgos and Tsakona.

The section between Elefsina and Korinthos is an existing three-lane motorway carrying heavy traffic volumes. The section between Korinthos and Patra, now a single carriageway will be upgraded, while beyond Patra an entirely new motorway will be constructed, reutilizing in certain parts the existing National Road. The various sections of the road are shown in table 1.

The entire project is shown in figure 1, including the existing sections of Elefsina-Korinthos (63.2 km) and the Patra’s Bypass (18.3 km) to be upgraded the new sections of Korinthos–Patra (120 km), Patra–Pyrgos (87.5 km) and Pyrgos–Tsakona (76.2 km) that will be constructed.

Table 1.: Sections of Olympia Odos

Section	**Length**	**Comment**
Thiva-Elefsina I/C to Archaia Korinthos I/C	63.2km	Existing motorway, with modification works to be done
Archaia Korinthos I/C to Patra peripheral first I/C (K1)	120.0km	New motorway to be built, generally located on the alignment of the existing New National Road
Patra peripheral: first I/C (K1) to last I/C (K7 Mintilogli)	18.3km	Existing motorway with modification works to be done
Patra peripheral last I/C (K7 Mintilogli) to Alphios I/C	87.5km	New motorway to be built, generally located away from the existing National Road
Alphios I/C to Tsakona (future Tripoli – Kalamata motorway)	76.2km	New motorway to be built, partially located on the alignment of the existing National Road
Total	**365.2km**	**Full length after completion**

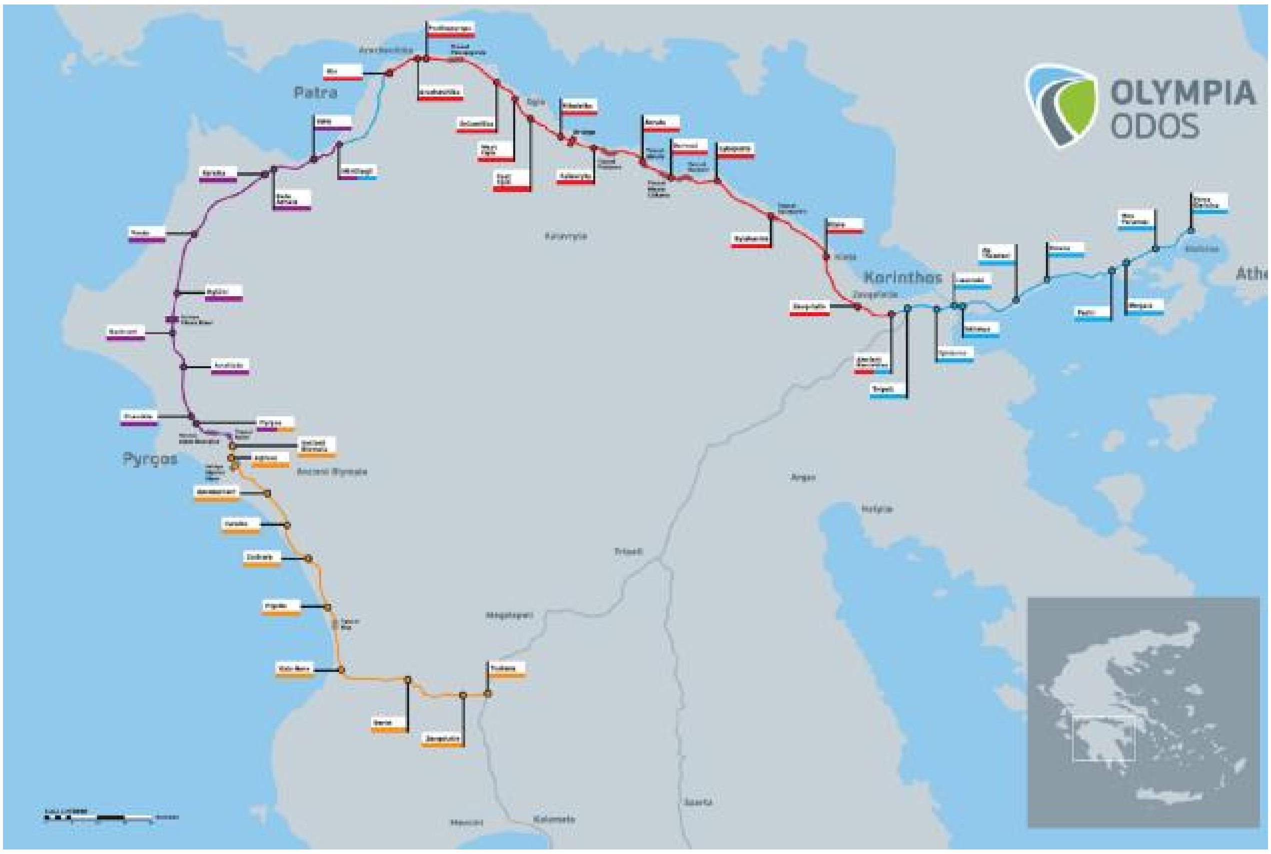

Figure 1: Olympia Odos – Elefsina – Korinthos – Patra – Pyrgos – Tsakona motorway

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1. INTRODUCTION

On February 1st 2010 APION KLEOS Construction J/V officially assigned to PAVETEST Ltd the Pavement Management System for the existing sections of Olympia odos: Elefsina-Korinthos and Patra's bypass. PAVETEST undertook the installation and first implementation of a Pavement Management System (PMS) according to the CJV's contractual requirements. Tender documents describing the pavement management system are presented in appendix 1.

Visual inspections were carried out on the 19th, 20th & 24th of November 2009 for the section of Elefsina – Korinthos and on the 29th & 20th of October 2009 for the Patra bypass section. Roughness measurements were carried out on the 30th January 2010 for the section Elefsina – Korinthos and on the 31st of January 2010 for Patra's bypass.

This report describes the methodology applied for the first implementation of a PMS, for the existing sections of Elefsina-Korinthos and the Patras Bypass.

2. PAVEMENT MANAGEMENT SYSTEM

2.1. Basic principals

Pavement Management Systems (PMSs) are cost effective tools, helping engineers to manage the significant investment made on pavements. A PMS can also estimate future pavement condition, thus supporting engineers in making critical decisions regarding the funding and construction or repair works on valuable pavement assets. The purpose of maintaining a PMS is not only to monitor current condition of a pavement network but also to plan repair and reconstruction works taking into consideration technical as well as economical facts. Additionally a PMS manages a road network as an asset, whose value must be either maintained or improved. At the same time it ensures that funding and budget are allocated to appropriate areas at the right time – figure 2.

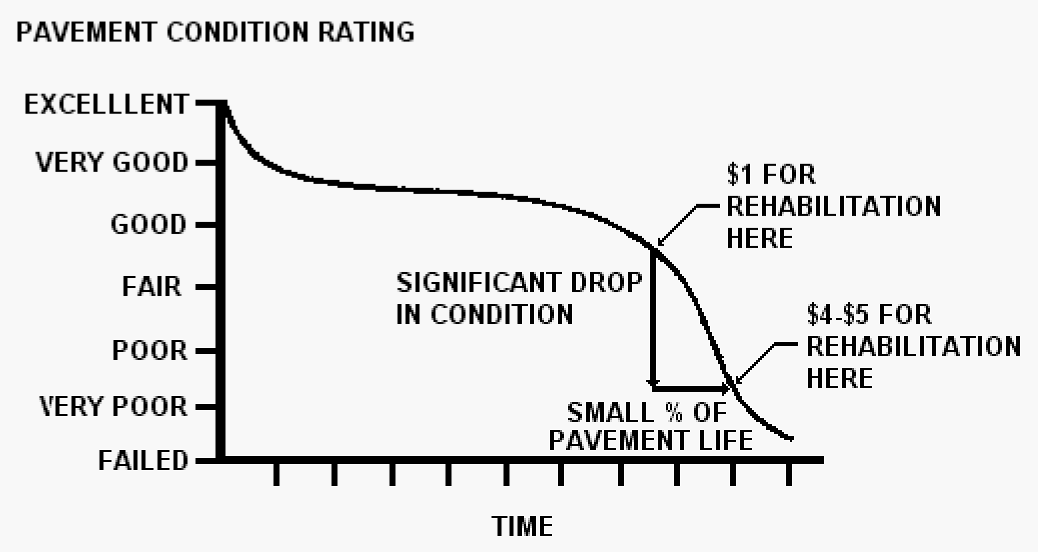

Figure 2: Pavement condition rating

Like any computerized system, PMSs are only as good as their data and algorithms. Data collection, validation and of course updating are constantly needed in order to deliver reliable results. This is why the foundation of a PMS is a combination of both qualified human resources together and computer software capabilities. A road and pavement engineer should not only gather all relevant data but also understand the concept of a PMS so as to properly insert all this information. On the other hand decision makers should benefit from software capabilities for processing large amounts of data, while maintaining a critical view of the results.

Data collection is an essential element of an efficient Pavement Management System. A properly planned and implemented data collection program significantly increases credibility, cost effectiveness and overall utility.

During the entire period of operation the pavement shall conform to different requirements for surface characteristics and structural adequacy according to the tender documents. For this reason a data collection program should focus on the following objectives:

- Deciding which information is needed
- Selecting the appropriate equipment to be used for regular pavement surveys in order to verify compliance to the requirements of surface characteristics
- Accuracy and precision of the data collected.
- Establishing appropriate warning thresholds and criteria for intervention to perform maintenance works
- Timeliness of collecting, processing and recording data in the system

2.2. Implementation of PMS – RoSy software

RoSy – Road Systems – is a comprehensive software package for strategic planning of systematic and optimum maintenance of road networks developed by Grontmij | Carl Bro Pavement Consultants. It is one the most widespread Pavement Management Systems.

RoSy PMS is a product based on many years of experience in practical road maintenance and work with road structures at the practical and theoretical levels. In a very close cooperation with road authorities in a number of countries, Grontmij | Carl Bro Pavement Consultants has combined this with high-technology know-how on software development.

Today RoSy PMS is used for the daily planning and management of the road maintenance in 19 countries: Roads ranging from German motorways to Danish minor roads and from the complex road network of the Norwegian capital Oslo to the superior road network in the Transoceanic road corridor - an area far larger than Europe.

RoSy's concept is to create logical connection between decision-makers, the financial consequences and the works that are made on the individual road sections in order to comply with the goals and strategies. It is an open system, which enables the user to establish, adapt and to change the system in accordance with local conditions. RoSy PMS is thoroughly tried and tested from the arctic to the tropics.

RoSy PMS software consists of a number of computer-based tools - modules for handling of pure technical as well as technical-economic tasks related to maintenance of so to speak all