

TEMPUS IV – Project n. 544460 – HiT4Med

Highway and Traffic Engineering: Curricular Reform for Mediterranean Area

1st Teaching Workshop

26-30 May 2014, Athens

Final program

May 16, 2014

Venue

National Technical University of Athens,
School of Rural and Surveying Engineering
Laboratory of Transportation Engineering
Zografou, GR-15780, Athens, GREECE

Starting date

May 26, 2014

Ending date

May 30, 2014

Schedule

May 26: Module 1.1, and 1.8
May 27: Modules 1.2 and 1.10
May 28: Modules 1.4 and 1.7
May 29: Modules 1.3, 1.5 and 1.9
May 30: Module 1.6

Course 1, Advanced highway design methods, 12 ECTS credits	
1.1 Contemporary road design approach	NTUA
1.2 The speed parameter	NTUA
1.3 Design consistency	NTUA and UniCT
1.4 3-D design controls	NTUA
1.5 Aesthetic road design criteria	NTUA and RMEI
1.6 Energy and environmental impacts of highway design	UPV
1.7 Design for heavy vehicles and powered two wheelers	NTUA
1.8 At grade unsignalized intersections	NTUA
1.9 Roundabouts	UniNA
1.10 Interchanges	NTUA

Detailed program

Monday, May 26, 2014

9:30 AM – 12:30 PM

Welcome to the participants

1.1 Contemporary road design approach (Prof. Basil Psarianos)

- Definition
- 2-D and 3-D geometric design
- Design controls, assumptions and criteria
- Urban, rural and transitional areas
- Design approach
- Sustainable road design
- Complete streets
- Self-explaining /Self-enforcing roads
- Context-sensitive design
- Performance-based design
- Risk-based design
- Flexibility in design
- Geometric design for resurfacing, restoration and rehabilitation

2:00 PM – 5:00 PM

1.8 At grade unsignalized intersections (Assist. Prof. Constantinos Antoniou)

- Design considerations and objectives
- Types and examples of intersections
 - Three-leg intersections
 - Four-leg intersections
 - Multi-leg intersections
 - Roundabouts
- Alignment and profile
- Islands, medians and channelization
- Intersection sight distance
- Intersection control
- Special topics
 - Indirect left-turns and u-turns
 - Pedestrian and bicycle flow
- Examples and case studies

Tuesday, May 27, 2014

9:30 AM – 12:30 PM

1.2 The speed parameter (Prof. Basil Psarianos)

- Physical definition
- Impact of speed in road design and operation
- Reference speed values for all road users
 - Designated design speed
 - Inferred design speed
 - Running speed
 - Operating speed
 - Speed variance
 - Speed limit
 - Advisory speed
 - Safe speed
 - Interrelationships
- Speed-related safety issues
- Speed prediction models
- Speed management

2:00 PM – 5:00 PM

1.10 Interchanges (Assist. Prof. Constantinos Antoniou)

- Background
 - Warrants for interchanges and grade separation
 - General types of interchanges
 - Safety and economic factors
- Types of interchanges
 - Three-leg designs
 - Four-leg designs
 - Other interchange configurations (including combination interchanges)
- Grade-separation structures
- Design considerations
 - Configuration determination
 - Spacing
 - Uniformity
 - Route continuity
 - Lane-balance
- Ramps
 - General design considerations
 - Ramp travelled-way widths
 - Ramp terminals
- Examples and case studies

Wednesday, May 28, 2014

9:30 AM – 12:30 PM

1.7 Design for heavy vehicles and powered two wheelers (PTWs) (Prof. Basil Psarianos)

- Design for heavy vehicles
 - Design vehicles
 - Vehicle characteristics
 - Design controls and criteria for heavy vehicles
 - Horizontal alignment
 - Vertical alignment
 - Intersections and interchanges
- Design for PTWs
 - Design vehicles
 - PTW characteristics
 - PTW safety facts
 - Horizontal alignment design
 - Intersection design
 - Special design controls

2:00 PM – 5:00 PM

1.4 3-D Design Controls (Prof. Basil Psarianos)

- 3-D design elements
- Coordination of horizontal and vertical alignment
- 3-D road visual deficiencies
- Safety aspects of 3-D road alignment
- State of the art of 3-D alignment design methodologies

Thursday, May 29, 2014

9:30 AM – 12:30 PM

1.3 Design Consistency (Prof. Basil Psarianos & Prof. Damiano Cafiso)

- Definition and rationale
- Consistency measures and controls
- Safety impacts
- Implementation
 - Speed consistency-speed profiles
 - Alignment consistency
 - Deceleration consistency
 - Intersection consistency
 - Interchange consistency
- Knowledge gaps
- Future perspectives

1.5 Aesthetic road design criteria (Prof. Basil Psarianos and Prof. Enzo Siviero)

- Landscape design
 - Background and terminology
 - Landscape and legibility
 - User's perception
 - Landscape sequence and interpretation units
 - Landscape analysis
- Aesthetics of roadway system elements
 - Basic concepts and aesthetic principles
 - Rural roads
 - New urban roads
 - Streets
 - Intersections and interchanges
 - Structures
 - Design tasks
 - Maintenance
- Examples and case studies

2:00 PM – 5:00 PM

1.9 Roundabouts (Associate Prof. Alfonso Montella)

- Design principles
 - Key features
 - Benefits
 - Selection Criteria
 - Classification
- Geometric design criteria
 - Design objectives
 - Alignment of approaches
 - Angle between approach legs
 - Central island



- Truck apron
- Splitter islands
- Pedestrian crossings and sidewalks
- Facilities for cyclists
- Entry width
- Entry radius
- Circulatory roadway slope and width
- Exit width
- Exit radius
- Right-turn bypass lanes
- Speed control
- Sight distance
- Vertical alignment
- Tutorials
 - Mini-roundabout
 - Single-lane roundabout in urban area
 - Single-lane roundabout in rural area
 - Double-lane roundabout in urban area
 - Double-lane roundabout in rural area

Friday, May 30, 2014

9:30 AM – 12:30 PM

1.6 Energy and environmental impacts of highway design (Prof. Alfredo Garcia)

- Vehicle energy consumption factors
- Vehicle emission factors
- Fuel consumption models
- Emissions models
- Impact of horizontal alignment
- Impact of vertical alignment
- Impact of intersection design
- Impact of traffic calming measures
- Case studies

2:00 PM – 5:00 PM

- Concluding discussion and feedback
- Lessons learned for next workshops