COURSE OVERVIEW SE0155
Advanced Graded Road and Pads Design

Course Title
Advanced Graded Road and Pads Design

Course Date/Venue
Session 1: June 29-July 03, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: November 24-28/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
SE0155

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

The course will describe the principles behind modern pavement designs, asphalt technology, hot mix design, differentiate the construction, design life performance, failure criteria, maintenance and rehabilitation of rigid and flexible pavements. Participants will be able to prepare site investigation reports, collect traffic, climatic and geological data necessary for pavement design as well as prepare and test subgrade-capping layers, selecting materials and designing asphalt mixtures to meet climate and traffic conditions of road pavement projects.

The participants of this course will be able to describe the specifications and structural properties of unbound subases and bases, identify properties of cement-treated subgrades, subbases and bases and the properties of asphalt bases and surfacing and recognize pavement quality concrete and explain flexible pavement distresses and maintenance.

Further, the course will discuss the approaches to pavement design and perform road tests as per AASHO and WASHO standards and the participants will be able to measure pavement deflection and the life of asphaltic pavements; analyze structural and analytical design procedures for flexible and concrete pavements and describe heavy loaded industrial pavement design including the skid resistance and its measurement.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on road pavement design, maintenance and rehabilitation techniques
- Describe modern pavements and the principles of modern pavement design
- Identify the design life performance and failure criteria
- Differentiate rigid versus flexible construction
- Perform climatic and geological data-site investigation
- Recognize road traffic, axle loading and the soil foundation
- Prepare and test subgrade-capping layers
- Discuss cement-treated subgrades, subbases and bases including asphalt bases and surfacings
- Illustrate hot mix design covering sampling, sample identification, sample preparation, extraction of asphalt concrete for testing, sieve analysis, methods of mix design, marshall mix design, pavement construction and pavement recycling, etc.
- Describe pavement quality concrete and perform road tests as per AASHO and WASHO standards
- Interpret pavement deflection and the life of asphaltic pavements
- Employ design procedures for flexible and rigid pavements
- Illustrate the structural design of flexible pavements and design of heavily loaded industrial pavements
- Explain skid resistance of pavements and its measurement
- Carryout pavement, maintenance and rehabilitation and discuss the causes and maintenance of cracking, distortion, disintegration, loss of friction resistance, life cycle cost analysis, present and future needs and priority programming of rehabilitation and maintenance, perpetual pavements and the use of recyclable materials in asphalt pavement

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of road pavement design, maintenance and rehabilitation techniques for road engineers responsible for the provision, approval, design, maintenance and rehabilitation of road pavements projects.

Course Fee

US$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Steve Magalios, CEng, PGDip (on-going), MSc, BSc, is a **Senior Civil Engineer** with almost **40 years** of extensive **On-shore & Offshore** experience in the **Oil & Gas**, **Construction**, **Refinery** and **Petrochemical** industries. His expertise widely covers in the areas of **Blast** Simulation, **Blast** Resistant & Resilient Design, Building Life Assessment & Retrofit Solutions for **Blast Resistance**, **Seismicity** Modelling, **Seismic Design** for Buildings, Advanced **Seismic & Wind Design** of **Reinforced Concrete**, Industrial Building Design, **Blast Resistance & Resilient** for Oil & Gas Field, **Concrete Structures & Building Rehabilitation**, **Reinforced Concrete Structures Protection**, **Concrete** Structure Inspection & Repair, **Concrete** Inspection & Maintenance, **Concrete Maintenance & Reliability Analysis**, Design and Behaviour of **Steel Structures**, **Advanced Steel Design & Stability** of **Structures Concrete Structural** Design, **Dynamic Analysis** of **Rotating Equipment** Foundations & **Structural Steel Piperacks**, **Concrete** Technology, **Construction** Planning, **Construction & Concrete Works** Maintenance, Advanced **Building Construction** Technology, **Geosynthetics & Ground Improvement** Methods, **Bench** Design, **Benching**, **Land Survey and ArcGIS for Earthworks & Management**, **ArcGIS** for Surveying, Computer Aided Design (**CAD**), **AutoCAD Civil 3D**, **GIS & Mapping**, **Structural Analysis & Design** (**STAAD PRO**), **Land Surveying** & Property Evaluation, **Earth Measurements**, **Earthwork** & **Structural Maintenance**, System Safety Program Plan (**SSPP**) Inspection, **Building & Road** Design Skills, **Civil Engineering Design**, **Structural Reliability** Engineering, **Road** Construction & Maintenance, **Road** Pavement Design, **Road** Maintenance, **Drainage** System Operations & Maintenance, **Blueprint** Reading & Interpretation, **Blue Print** Documentation, Mechanical **Drawings**, **P&ID**, **Flow Diagram** Symbols, **Cartographic** Representation, Soil Classification, **Cadastral Surveying** & Boundary Definition, **Project Engineering** & Design, **Construction** Management, **Project Planning** & Execution, **Site Management**, **Site Supervision**, Effective **Resource Management**, **Project Evaluation**, **FEED** Management, **EPC Projects** Design, **Project Completion & Workover**, Quality Control and Team Management. He is also well-versed in **Pipeline** Operation & Maintenance, **Pipeline** Design & Construction, **Pipeline** Engineering, Scraper Traps, Burn Pits, Risk Assessment, HSE Plan & Procedures, **Construction** Planning, Methods & Management, **Sloping**, **Embankments**, **Construction** Planning, **Construction Quality** Management, **Project Risk** Assessment, **Project Quality** Plans, **Excavation**, **Backfill & Compaction**, **Excavation & Reinstatement**, **Excavation Safety** for Construction, **Groundworks Supervision**, **Construction Quality** Remote Sensing, Construction Materials, Construction Surveying, **Detailed Engineering** Drawings, Codes & Standards Quality Plan & Procedures, Safety & Compliance Management, Permit-to-Work Issuer, ASME, API, ANSI, ASTM, BS, NACE, ARAMCO & KOC Standards, MS Office tools, **AutoCAD**, **STAAD-PRO**, GIS, ArcInfo, ArcView, Autodesk Map and various programming languages and software such as **SHOTPlus**, FORTRAN, BASIC and AUTOLISP. Currently, he is the **Chartered Professional Surveyor Engineer & Urban-Regional Planner** wherein he is deeply involved in providing exact data, measurements and determining properly boundaries. He is also responsible in preparing and maintaining sketches, maps, reports and legal description of surveys.

During his career, Mr. Magalios has gained his expertise and thorough practical experience through challenging positions such as a **Project Site Construction Manager**, **Construction Site Manager**, **Project Manager**, **Deputy PMS Manager**, **Head of the Public Project Inspection Field Team**, **Technical Consultant**, **Senior Consultant**, **Consultant/Lecturer**, **Construction Team Leader**, **Lead Pipeline Engineer**, **Project Construction Lead Supervising Engineer**, **Civil Engineer**, **Lead Site Engineer**, **Senior Site Engineer Lead Engineer**, **Senior Site Engineer**, **R.O.W. Coordinator**, **Site Representative**, **Supervision Head** and **Contractor** for international Companies such as the Penspen International Limited, Eptista Servicios de Ingeneria S.I., J/V ILF Pantec TH. Papaioannou & Co. – Emenergy Engineering, J/V Karaylannis S.A. – Intracom Constructions S.A., Ergaz Ltd., Alkyonis 7, Palaeo Faliro, Piraeus, Elpet Valkaniki S.A., Asprofos S.A., J/V Depa S.A. just to name a few.

Mr. Magalios is a **Registered Chartered Engineer** and has a **Master's** and **Bachelor's** degree in **Surveying Engineering** from the **University of New Brunswick**, **Canada** and the **National Technical University of Athens**, **Greece**, respectively. Further, he is currently enrolled for **Post-graduate** in **Quality Assurance** from the **Hellenic Open University**, **Greece**. He has further obtained a Level 4B Certificates in Project Management from the National & Kapodistrian University of Athens, Greece and Environmental Auditing from the Environmental Auditors Registration Association (EARA). Moreover, he is a **Certified Instructor/Trainer**, a **Chartered Engineer** of Technical Chamber of Greece and has delivered numerous trainings, workshops, seminars, courses and conferences internationally.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Modern Pavements & the Principles of Pavement Design*** *Objectives of Pavement Design • Pavement Types • Pavement Layers • Approaches to Pavement Design • Responsibilities of the Design Engineer • Basic Information Necessary to the Design of Pavements*
0930 – 0945	*Break*
0945 – 1100	***Design Life-Performance & Failure Criteria*** *Design Life • Distresses versus Failure • Failure Criteria • Failure Criteria for Flexible Pavements • Failure Criteria for Concrete Pavements*
1100 – 1215	***Rigid Versus Flexible Construction*** *Costs • Life Expectancy • Riding Quality • Road Noise • Construction Experience • Comparison of Concrete and Flexible Road Construction*
1215 – 1230	*Break*
1230 – 1330	***Climatic & Geological Data-Site Investigation*** *Rainfall and Evaporation • Temperature • Depth of Frost Penetration • Climate of the Middle East • Preparation of the Site Investigation Report • Scope of the Site Investigation Report • Tests to be Carried Out on Samples*
1330 – 1420	***Road Traffic & Axle Loading*** *Types of Commercial Vehicles in Use in Relation to the Prevailing Limits of Maximum Axle Load and Gross Vehicle Weight • Collection of Traffic Data • Distribution of Commercial Vehicles and Private Cars Between the Traffic Lanes • Types of Commercial Vehicles and Their Axle Loading • Traffic Loading Expressed in Terms of Standard Axles*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0900	***The Soil Foundation*** *The Constitution of Soil • Particle Size Distribution • Description of Soils in Terms of Particle Groups • Relative Size and Surface Areas of Particles • Nature of Soil Particles • The Solvent Action of Water • The State of the Soil • Plasticity of Clay Soils • Soil Classification • Compaction of Soil • The Distribution and Movement of Water in Soil • Consolidation of Clay Soils • The Effect of Climate on the Moisture Distribution of Soil • The Strength of Soil • Elastic Properties of Soil*
0900 – 0915	*Break*
0915 – 1045	***Preparation & Testing of the Subgrade-Capping Layers*** *Preperation of the Formation • The Testing of Subgrades • The Use of Subgrade Capping and Geotextile Fabrics in Eathworks*

1045 – 1200	***Cement-Treated Subgrades, Subbases & Bases*** *The Cement Treatment of Subgrades • Cement-Bound Granular Material • Lean Concrete • Influence of Sample Dimensions on the Measure Strength of Cement Materials • Practice in Relation to Cement Subbases and Bases • The Structural Properties of Cemented Base, Subbase and Capping Materials*
1200 – 1215	*Break*
1215 – 1420	***Asphalt Bases & Surfacings*** *The Marshall Test Procedure • Specifications for Asphaltic Concrete Materials • The Elastic Properties of Bituminous Materials • The Fatigue of Bituminous Materials Under Repeated Loading*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Hot Mix Design*** *Physical Characteristic of Aggregates and Asphalt Cement • Sampling, Sample Identification and Sample Preparation • Extraction of Asphalt Concrete for Testing • Sieve Analysis*
0930 – 0945	*Break*
0945 – 1100	***Hot Mix Design (cont'd)*** *Types of Hot Mixes and Methods of Mix Design • Marshall Mix Design (Participant Interaction with Problem Solving and Examples) • Pavement Construction and Pavement Recycling • Cold in Place Recycle Technology • Emulsions*
1100 – 1215	***Pavement Quality Concrete*** *Concrete Mix Design • Compressive Strength • The Relationship Between the Compressive Strength and Modulus of Rupture Concrete The Relationship Between Elastic Modulus, Compressive Strength, and Age • Poisson's Ratio of Pavement-Quality Concrete • Fatigue of Concrete Pavements • Relationship Between Fatigue and Age of Concrete*
1215 – 1230	*Break*
1230 – 1330	***AASHO & WASHO Road Tests*** *Purpose of the AASHO Road Test • Site Details • Layout of the Experiment • Thickness Combinations and Materials Used for Flexible Pavements • Thickness Combinations and Materials Used for Concrete Pavements • The Concept of Present Serviceability • The Application of Present Serviceability to the Flexible Pavements • Evaluation of the Performance of Flexible Pavements • The Application of Present Serviceability to Concrete Pavements • Evaluation of the Performance of Concrete Pavements • The WASHO Road Test*
1330 – 1420	***Pavement Deflection & the Life of Asphaltic Pavements*** *Measurement of the Deflection of Flexible Pavements • Deflection Studies on Full-Scale Pavement Design Experiments • Discussion*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

0730 – 0930	***Design Procedures for Flexible & Rigid Pavements*** *Traffic • Thickness of Flexible Pavement Layers • Concrete Pavements • Design of Hard Shoulders • Design of Housing Estate and Similar Roads • The AASHTO Guide for Design of Pavement Structures • Flexible Pavements • The Asphalt Institute Design Procedure for Flexible Pavements • Thickness Design for Concrete Highway and Street Pavements*
0930 – 0945	*Break*
0945 – 1100	***The Structural Design of Flexible Pavements*** *Principles of Structural Analysis of Pavements • The Finite-Element Method • The Application of Structural Analysis to Pavement Deflection Measurements • The Application of the Finite-Element Method to Flexible Pavement Design*
1100 – 1215	***The Design of Heavily Loaded Industrial Pavements*** *Design Approach for Heavily Loaded Industrial Pavements • Examples of Structural Design Applied to Industrial Pavements*
1215 – 1230	*Break*
1230 – 1420	***The Skid Resistance of Pavements & Its Measurement*** *Measurement of the Slipperiness of Road Surfaces • The Development of Skid Resistance Criteria for Different Types of Road • Factors Which Affect the Skid Resistance of Road Pavements • Research Studies into the Factors Which Influence the Skid Resistance of Pavements • The Surface Characteristics Influencing Resistance to Skidding • Fine Texture or Microtexture Coarse Texture or Macrotexture*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

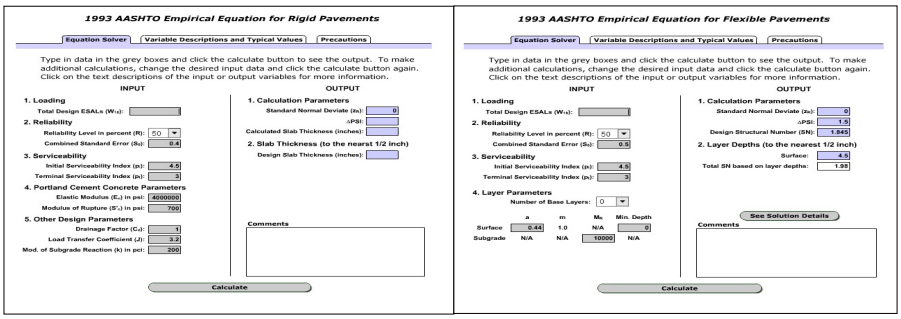
Day 5

0730 – 0930	***Pavement Maintenance & Rehabilitation*** *Causes and Maintenance of Cracking (Fatigue, Longitudinal, Thermal, Block, Slippage and Reflection Cracking) • Distortion (Shoving, Rutting and Corrugation)*
0930 – 0945	*Break*
0945 – 1100	***Pavement Maintenance & Rehabilitation (cont'd)*** *Disintegration (Raveling and Stripping) • Loss of Friction Resistance*
1100 – 1215	***Pavement Maintenance & Rehabilitation (cont'd)*** *Life Cycle Cost Analysis (Participant Interaction with Problem Solving and Examples) • Determination of Present and Future Needs and Priority Programming of Rehabilitation and Maintenance*
1215 – 1230	*Break*
1230 – 1345	***Pavement Maintenance & Rehabilitation (cont'd)*** *Perpetual Pavements • Use of Recyclable Materials in Asphalt Pavement*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

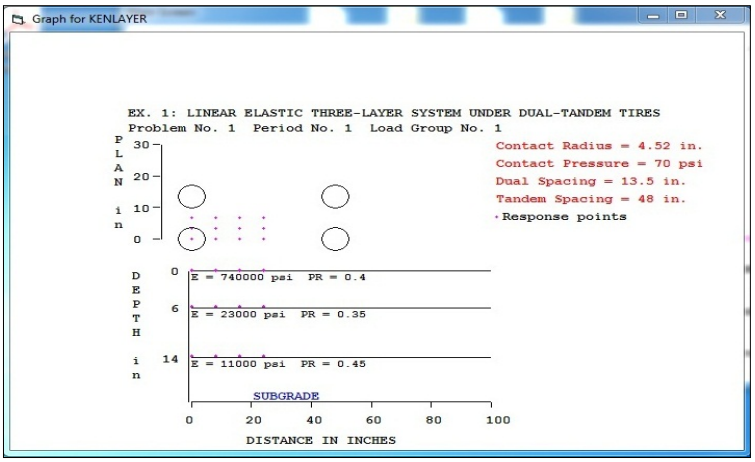
Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the "Empirical Equation for Flexible & Rigid Pavement" and "Pavement Analysis and Design" simulators.

(1) Empirical Equation for Flexible & Rigid Pavement



(2) Pavement Analysis and Design



Course Coordinator

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