TECHNION
Azrieli Continuing Education and External Studies Division

DUHIFAT
ENGINEERING Ltd

Transportation
Research Institute

DESIGN AND MAINTENANCE OF AIRPORT PAVEMENTS

Four-Day Workshop in Tel Aviv

In collaboration with Technion – Azrieli Continuing Education and External Studies Division

at the **Azrieli Sarona Campus Tel Aviv, Israel** | **Dec. 4-7, 2017**

The subject of airport pavement design and maintenance is a fascinating and broad discipline of high importance to aircraft operators as well as significant to passenger comfort and safety.

The Israeli institute of technology, the Technion and Duhifat Engineering Ltd., a specialty firm providing pavement engineering expertise to civilian and military airports in Israel, now offers you the opportunity to broaden the knowledge in the field of airport pavements.

This course is designed to provide an overview of the key aspects of design and maintenance of flexible and rigid pavements and will give the participant the tools necessary to make sound decisions in the pavement design and maintenance process.

First course graduation photo

Professionals dealing with pavement projects are constantly facing questions such as:

- What are the relevant design concepts and what do they mean?
- How should they be implemented?
- What is the best pavement type for the project, rigid or flexible? (advantages and disadvantages)
- Types of pavement distress- what do they mean and how should they be treated?
- What is PCN and how is it calculated?

These are some of the many questions that will be discussed and elaborated during the course.

For further deatiles and regestration ▸ **Duhifat Engineering Ltd.**

Tel/Fax: +972-737274462 | **Mobile:** +972-545909996 | **E-mail:** Dori@duhifat-eng.com

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Some of the concepts you will learn include:

- Factors that need to be considered when designing pavements for runways, taxiways or aprons, such as soil characteristics, aircraft traffic volume and loads, temperature, and many more
- Geotechnical aspects of pavement design including CBR, soil plasticity, and maximum soil density
- Importance of pavement surface characteristics such as roughness and friction
- Relevant design criteria such as FAA Advisory Circulars
- FAA Design Softwares
- ACN/PCN
- Advantages and disadvantages of different pavement systems
- PMS- Pavement Management System
- Management aspects of pavement projects

A laboratory tour will demonstrate all the test procedures pertinent to pavement design and includes hands-on experience performing some of the tests by yourself. A field visit to an airfield pavement construction site will enrich the course participant experience and provide the opportunity to ask questions about field related issues.

The combination of in-classroom lectures combined with the laboratory tours and field visits will provide the participant with a well-rounded and empowering experience.

Laboratory tour

Target Audience

- Airport operations managers
- Airport civil engineers
- Airfield designers
- Airfield construction engineers and supervisors
- Airfield project management engineers

Course Instructors

M.E. Dori Alkalay | *(conducts sessions 1, 2, 4, 5, 6, 9, 10, 12, 14)*

M.E. in pavement structure design, B.Sc. (1995) in civil engineering of the Technion. Former CTO (Chief Technology Officer) of the Israel Air force (IAF) specializing in runways and currently a pavement consultant on airfield rigid and flexible pavements.

Mr. Dori Alkalay is the owner of Duhifat engineering LTD that deals with pavement design and maintenance issues for roads and airfields.

Mr. Dori Alkalay is a known trainer holding courses for the IAF and civil engineers.

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Course Instructors

Assoc. Prof. KONSTANTIN KOVLER, Ph.D. | *(conducts session 3)*

Head, Department of Building Materials, Performance & Technology National Building Research Institute of the Technion.

Head, "B.Sc. in Civil Engineering - Management and Construction" Program Head, "Building Materials, Performance & Technology Graduate Studies" Program Department of Structural Engineering and Construction Management.

Lior Blum |
(Conducts sessions 8)

Chief Engineer Pavements in Israel Airports Authority (IAA) since 2010. M.A. Public Policy, Tel Aviv University and B.S.C Civil Engineer, Technion, Haifa.

Responsible for the realization of IAA infrastructure projects (in a total sum of over 250 million Euros) before, during and after construction, including total engineering involvement, preparation of budgets estimates, management of designers, advisers and contractors.

Dr. Raphael Yaron |
(conducts sessions 13)

B.Sc. (1977) and D.Sc. (1994) in civil engineering (Technion, Haifa, Israel). M.Sc in Operations Research (1984, Tel Aviv University).

Founder and a partner in Aram Engineers ltd, a civil engineering consulting company specializing in design, quality assurance and project management. Special specification in the issues of pavement structural design and geotechnical engineering. The company works both in Israel and abroad and has vast experience in the design of various types of pavements (asphalt, concrete, pavers, natural stones etc.) , for airports, ports and other special purpose surfaces.

Eng. Edmundo Botner |
(conducts session 15)

Mr. Botner is a recognized expert in pavement engineering and geographic information systems. He has participated in numerous feasibility studies, pavement design, and transportation asset management projects.

He has consulted for the Inter-American Development Bank and has worked in Argentina, Israel, Uruguay, Bolivia, Paraguay, Peru, Panama, Guatemala, Brazil, and Nigeria.

He has specialized in the development of transportation asset management solutions, including airports, by collecting and analyzing pavement performance parameters - including roughness, rutting, road geometry, friction, FWD, GPR and more.

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Course Outline

The four day course will be given Monday through Thursday.
The course content and schedule will be as follows:

Day	Time	Session	Topic	Contents
DAY 1	08:00 - 08:30	-	Sign in	
	08:30 - 10:00	-	Introduction	Review of course syllabus and participant self-introduction.
	10:00 - 12:00	1	Basic concepts	AASHTO soil classification, density, compaction, CBR, Atterberg limits (liquid and plastic limits), subgrade, subbase, base, etc.
	12:00 - 12:15	-	*Coffee Break*	
	12:15 - 13:45	2	Asphalt Concrete and Flexible Pavement Design	What is asphalt concrete- ingredients, Marshall stability, Superpave, viscoelasticity, elementary cube, bitumen binder-PG, gradation line, asphalt mixtures, emulsions- TCE,PCE, Miner's Law, principles of flexible pavement design.
	13:45 - 14:45	-	*Lunch Break*	
	14:45 - 16:15	3	Concrete	What is concrete- ingredients, strength properties- compressive, flexural, tensile. Reinforcement types, curing, concrete types.
	16:15 - 16:30	-	*Coffee Break*	Group photo will be taken
	16:30 - 17:30	4	Rigid Pavement Design	Westergaard's equations for corner, center and edge loads, coefficient of subgrade reaction (k), radius of rigidness (l), slab size calculation, joint types, dowels and tie bars.
DAY 2	8:30 - 10:30	5a	FAA- Flexible and Rigid Pavement Design	Pavement design workshop according to the new AC-150/5320-6F and FAARFIELD 1.4 software. Participants should download the software and bring laptops with them. ***New software version - 1.4. will be released in the upcoming months***
	10:30 - 10:45	-	*Coffee Break*	
	10:45 - 11:30	5b	FAA- Flexible and Rigid Pavement Design	Part 2 of topic presentation.
	11:30 - 12:15	6a	ACN/PCN	ACN/PCN definitions. Calculation workshop according to FAA AC- 150/5335-5c and COMFAA software. Participants should download the software and bring laptops with them.
	12:15 - 13:15	-	*Lunch Break*	
	13:15 – 14:15	7	If you can dream it - You can do it	On Top Presentation - an after lunch, out of scope presentation- How to rediscover your natural creativity and use it for success? An interactive experience combining games, FUN and practical techniques. ***Eyal Zohar*** | *Senior lecturer (MBA, BSc.) for Creativity and innovation, Combines intensive managerial background with 20 years of experience in delivering WOW lectures to leading global organizations such as Intel, Amdocs, Teva, Microsoft.*
	14:15 - 14:30	-	*Coffee Break*	
	14:30 - 16:00	6b	ACN/PCN	Part 2 of topic presentation.
	16:00 - 17:00	8	Project Management	Engineering Aspects of pavement project management based on lessons learned at the Tel Aviv Airport upgrade project in 2008-2012.

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Day	Time	Session	Topic	Contents
DAY 3	08:00 - 9:00	-	Travel	Bus trip to a testing laboratory in Ashdod.
	09:00 - 12:30	9	Laboratory Tour	GPR, FWD, LL, PL, AASHTO compaction, Binder tests, sieve gradation, LA Abrasion test, sand equivalent test, Asphalt density test (SSD) and more.
	12:30 - 13:30	-	*Lunch Break*	Lunch at a restaurant in the city of Gedera.
	13:30 - 14:15	-	Travel	Bus ride to Ben-Gurion Airport.
	14:15 - 15:45	10	Asphalt Factory tour	A tour at an asphalt factory and a quarry
	15:45 - 16:45	-	Travel	Bus ride back to Tel Aviv.
	19:00 - 22:00	11	City Night tour	A guided night tour in the beautiful city of Jaffa, dinner in a local elegant restaurant.
DAY 4	08:30 - 10:00	12	Pavement Distress	Pavement distress and failure modes in flexible and rigid pavements.
	10:00 - 10:15	-	*Coffee Break*	
	10:15 - 11:45	13	Use of Geo-synthetics in Pavements	Basic properties, types, geotextile vs. geogrids, mechanics of behavior, design by function – separation, reinforcement.
	11:45 - 12:45	-	*Lunch Break*	
	12:45 - 13:15	14	Roughness	Definition of pavement roughness, guidelines and procedures for pavement roughness measurement and evaluation, effect of roughness on pavement life.
	14:15 - 14:30	-	*Coffee Break*	
	14:30 - 16:00	15	Pavement Management Systems	Introduction to Pavement Management System - Vehicle, Technology, PCI, OPI etc.
	16:00 - 17:00	16	Test and Conclusion	Test – (short and sweet). Course Feedback Form. Graduation Diploma.

* Changes in time table and presenters are possible

Optional Activities

Day trip that includes a guided tour of the holy city of Jerusalem, lunch break, followed by a bus ride for a swim in the Dead Sea.

- *Participation is optional and additional payment is required.*
- *Contact Duhifat engineering Ltd for further details.*

Training Location

The course will be held at **the Technion academic center** at Shrona, 18 David Elazar St., Tel-Aviv, Israel. Located in the midst of Tel-Aviv's ones busiest active business centers.

- *Participants are asked to make their own travel arrangements.*

Registration is limited so please make your reservations as soon as possible.

All participants will receive the course learning material (handbook), a completion Technion Certificate, recognized throughout academic institutes, and the lasting memory of a wonderful experience in Israel.

Language ▸ English

Duration ▸ 4 Days (+1 day of trip to whoever is interested)

Course fee ▸ 2,225 U.S.D+VAT *(Course fee includes- the registration, training material and examination, graduation certificate, framed group photo as well as coffee breaks, business lunch, travel expenses for the third day, dinner & night tour at Jaffa)*

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