

# **CURRICULUM VITAE**

**Dr. SHMUEL OLEK**

**July 2020**

# CURRICULUM VITAE

## SHMUEL OLEK

### Personal:

|                                 |  |
|---------------------------------|--|
| <i>Name:</i>                    | Shmuel Olek.                               |
| <i>Citizen of:</i>              | Israel.                                    |
| <i>Place and date of birth:</i> | Israel, February 20 <sup>th</sup> , 1953.  |
| <i>Marital Status:</i>          | Married + four children.                   |
| <i>Present Address:</i>         | 7 Camil Hoismans St., Haifa 34987, Israel. |
| <i>Telephone:</i>               | Home: 972-4-8247467    Work: 972-4-8111396 |
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### Academic Degrees:

|       |  |
|-------|--|
| 1987: | Ph.D., Mechanical Engineering, Technion,<br>Israel Institute of Technology, Haifa, Israel. |
| 1982: | M.Sc., Mechanical Engineering, Technion,<br>Israel Institute of Technology, Haifa, Israel. |
| 1975: | B.Sc., Mechanical Engineering, Technion,<br>Israel Institute of Technology, Haifa, Israel. |

### Languages:

Hebrew, English, Basic German

### Present Position:

Joint Manager, J-ROM Ltd.

## **Previous Academic Appointment:**

- |            |  |
|------------|--|
| 1986-1988: | Post doctoral work at the Paul Scherrer Institute, Switzerland.  |
| 1980-1986: | Teaching and research assistant in thermodynamics, fluid dynamics, heat transfer and computers in the Faculty of Mechanical Engineering, Technion, Israel. |

## **Teaching Experience:**

### **Israel Electric Corporation Ltd., 1988-1995**

1. Compressible Flow.
2. Two-Phase Flow.

## **Graduate Level:**

### *Assistant at the Faculty of Mechanical Eng., Technion, Haifa, Israel, 1980-1986*

1. Heat and Mass Transfer
2. Heat Conduction
3. Numerical Methods in Mechanical Engineering
4. Analytical Methods in Mechanical Engineering (1)
5. Analytical Methods in Mechanical Engineering (2)
6. Advanced Hydrodynamics

## **Undergraduate Level:**

Assistant at the Faculty of Mechanical Eng., Technion, Haifa, Israel, 1980-1986

1. Programming and Numerical Analysis (
2. Numerical Analysis Lecturer)
3. Thermodynamics (1)
4. Thermodynamics (2)
5. Fluid Mechanics
6. Viscous Flow
7. Advanced Hydrodynamics
8. Heat Convection
9. Engineering Laboratory
10. Introduction to Computers

## **Israel Navy, 1977-1980**

1. Hydraulics and Servo-Hydraulics systems.
2. Weapons.
3. Control Systems.

## **Student's Supervision Experience:**

|                 |   |
|-----------------|---|
| Mr. Roni Dagan  | Master of Science in Nuclear Engineering.<br>Subject: Critical Two Phase Flow. Degree awarded in 1990.  |
| Mr. Ami Nagler  | Master of Science in Nuclear Engineering.<br>Subject: Emergency Core Cooling of a Swimming Pool Type Reactor. Degree awarded in 1990.             |
| Mr. Alon Davidy | Master of Science in Nuclear Engineering.<br>Subject: Emergency Core Cooling of an Oxidizing Surface in Nuclear Reactors. Degree awarded in 1999. |

## **Research Experience:**

From 2001:

***J-ROM Ltd.***

Computational Fluid Dynamics - CFD,  
analytical methods for the solution of linear and  
nonlinear differential equations,  
modeling of ecosystems,  
design problems,  
evacuation simulations,  
economic studies.

1988-2001

***Israel Electric Corporation Ltd.***

Computational Fluid Dynamics,  
natural gas storage and transmission,  
compressed air energy storage, pumped storage,  
modeling of ecosystems,  
natural convection in porous media, problems  
in two-phase flow, in particular rewetting  
of hot surfaces, critical flow, and bubble growth,  
analytical methods for the solution of nonlinear  
differential equations,  
conjugate heat transfer  
economic studies.

1986-1988:

***PSI-Paul Scherrer Institute,  
CH-5303 Wuerenlingen, Switzerland.***

Theoretical and experimental investigation of  
problems in two-phase flow, in particular  
rewetting of hot surfaces.

1980-1986:

***Faculty of Mechanical Eng., Technion,  
Haifa, Israel.***

Theoretical and experimental investigations  
of heat and mass transfer, fluid flow and  
thermodynamics, mostly related to rotating  
flow and two-phase flow.

1976-1980:

***Captain. Department of Weapon Systems,  
Israel Navy.***

**Current Research Subjects:**

- Computational Fluid Dynamics (CFD) of various problems
- Analytical models in fluid dynamics and heat transfer
- Evacuation of people from buildings, railway and road tunnels, stadiums and airports, with and without hazards (such as smoke, toxic gases, heat radiation, and high temperature).

# LIST OF PUBLICATIONS

SHMUEL OLEK

## I. Theses:

Ph.D. Thesis: Rewetting of Hot Surfaces (awarded the Landau Prize).

Advisers: Yoram Zvirin and Ezra Elias.

M.Sc. Thesis: Rotating Flow over a Finite Disk.

Advisers: Alexander Solan and Meir Toren.

## II. Refereed Publications:

1. A. Solan, S. Olek and M. Toren, "Rotating Compressible Flow over an Infinite Disk", ASME, J. Appl. Mech., Vol. 50, 1983, pp. 511-516.
2. P. Bar-Yoseph and S. Olek, "Asymptotic and Finite Element Approximations for Heat Transfer in Rotating Compressible Flow over an Infinite Porous Disk", Computers & Fluids, Vol. 12, No. 3, 1984, pp. 177-197.
3. S. Olek and Y. Zvirin, "The Effect of Temperature Dependent Properties on the Rewetting Velocity", Int. J. Multiphase Flow, Vol. 11, No. 4, 1985, pp. 577-581.
4. S. Olek, Y. Zvirin and E. Elias, "Rewetting of Hot Surfaces by Falling Liquid Films as a Conjugate Heat Transfer Problem", Int. J. Multiphase Flow, Vol. 14, No. 1, 1988, pp. 13-33.
5. S. Olek, E. Elias and Y. Zvirin, "The Relation Between the Rewetting Temperature and the Liquid-Solid Contact Angle", Int. J. Heat Mass Transfer, Vol. 31, No. 4, 1988, pp. 898-902.
6. S. Olek, "On the Two-Region Rewetting Model with a Step Change in the Heat Transfer Coefficient", Nucl. Eng. Des., Vol. 108, 1988, pp. 315-322.
7. S. Olek, "The Effect of Precursory Cooling on Rewetting of a Slab", Nucl. Eng. Des., Vol. 108, 1988, pp. 323-330.
8. S. Olek, "Solution to a Fuel-and-cladding Rewetting Model", International Communications in Heat and Mass Transfer, Vol. 16, No. 1, 1989, pp. 143-158.

9. S. Olek, "Rewetting of a Solid Cylinder with Precursory Cooling", Appl. Sci. Res., Vol. 46, 1989, pp. 347-364.
10. S. Olek, Y. Zvirin and E. Elias, "Bubble Growth Predictions by the Hyperbolic and Parabolic Heat Conduction Equations", Waerme und Stoffuebertragung, Vol. 25, 1990, pp. 17-26.
11. S. Olek, "Wiener-Hopf Technique Solution to a Model of Rewetting with Precursory Cooling", Nucl. Sci. Eng., Vol. 105, 1990, pp. 271-277.
12. S. Olek, Y. Zvirin, and E. Elias, "A Simple Correlation for the Minimum Film Boiling Temperature", ASME J. Heat Transfer, Vol. 113, 1991, pp. 263-264.
13. S. Olek, E. Elias, E. Wacholder, and S. Kaizerman, "Unsteady Conjugated Heat Transfer in Laminar Pipe Flow", Int. J. Heat Mass Transfer, Vol. 34, 1991, pp. 1443-1450.
14. R. Dagan, E. Elias, E. Wacholder and S. Olek, "A Two-Fluid Model for Critical Flashing Flows in Pipes", Int. J. Multiphase Flow, Vol. 19, 1993, pp. 15-25.
15. S. Olek, "An Analytical Solution to the Multispecies Lotka-Volterra Equations", Siam Reviews, Vol. 36, 1994, pp. 480-488.
16. S. Olek, E. Wacholder, and E. Elias, "Analytical Solution of Two-Dimensional Steady State Heat Conduction in Reactor Fuel Elements", Nucl. Eng. Des., Vol. 150, 1994, pp. 49-60.
17. I. Arshavski, Y. Nekhamkin, S. Olek, and E. Elias, "Conjugate Heat Transfer in an Open Loop Thermosyphon", Int. Comm. Heat Mass Transfer, Int. Comm. Heat Mass Transfer, Vol. 21, 1994, pp. 153-166.
18. S. Olek, "Quenching of a Slab", Int. Comm. Heat Mass Transfer, Vol. 21, 1994, pp. 333-444.
19. I. Arshavski, Y. Nekhamkin, S. Olek, and E. Elias, "Conjugate Heat Transfer During Falling Film Evaporation", Int. Comm. Heat Mass Transfer, Int. Comm. Heat Mass Transfer, Vol. 22, 1995, pp. 271-284..
20. I. Shnaid and S. Olek, "Pressure Perturbations Method for Analysis of Transient Compressible Gas Flow around Wells in Porous Media", Int. J. Heat Mass Transfer, Vol. 38, 1995, pp. 2697-2700.



21. S. Olek and P. Vadasz, "Heat Transfer Regimes for Free Convection in Rotating Porous Media", *Heat Transfer*, Taylor and Francis, Levittown, PA, Vol. 4, pp. 423-428, 1998.
22. P. Vadasz and S. Olek, "Transitions and Chaos for Free Convection in a Rotating Porous Layer", *Int. J. Heat Mass Transfer*, Vol. 41, No. 11, 1998, pp. 1417-1435.
23. S. Olek "Solution of the Nonlinear Porous Media Equation for Isothermal Gas Flows by Eigenfunctions Expansions", *Appl. Math. Lett.*, Vol. 11, 1998, pp. 9-13.
24. S. Olek, "Heat Transfer in Duct Flow of Non-Newtonian Fluids with Axial Conduction", *Int. Comm. Heat Mass Transfer*, Vol. 25, No. 7, 1998, pp. 29-38.
25. S. Olek, "Multi-Region Conjugate Heat Transfer", *Hybrid Methods in Engineering*, Vol. 1, No. 2, 1999.
26. P. Vadasz and S. Olek, "Computational Recovery of the Homoclinic Orbit in Porous Media Convection", *Int. J. Non-Linear Mechanics*, Vol. 34, No. 6, 1999, pp. 1071-1075.
27. P. Vadasz and S. Olek, "Weak Turbulence and Chaos for Low Prandtl Number Gravity Driven Convection in Porous Media", *Transport in Porous Media*, Vol. 37, 1999, pp. 69-91.
28. P. Vadasz and S. Olek, "Convergence and Accuracy of Adomian's Decomposition Method for the Solution of Lorenz Equations", *Int. J. Heat Mass Transfer*, Vol. 43 (10), 2000, 1715-1734.
29. P. Vadasz and S. Olek, "Route to Chaos in Moderate Prandtl Number Convection in a Porous Layer Heated from Below", *Transport in Porous Media*, Vol. 41, 2000, pp. 211-239.
30. A. Davidy, E. Elias and S. Olek, "Quenching of Hot Oxidizing Surfaces", *Nucl. Eng. Des.*, Vol. 204, 2001, pp. 361-368.

## Participation at Conferences:

1. "Finite Element Analysis of Heat Transfer in Rotating flow over an Infinite Porous Disk",  
Numerical Methods in Thermal Problems, Proceedings of the Third International Conference, Seattle, U.S.A., 2nd-5th August 1984, pp. 457-465.  
(with P. Bar-Yoseph).
2. "The Effect of Temperature Dependent Properties on the Rewetting Velocity",  
Annual Meeting of the Nuclear Societies in Israel, Haifa, December 1983.  
(with Y. Zvirin).
3. "A. Conjugate Heat Transfer Model for Rewetting of Hot Surfaces".,  
Annual Meeting of the Nuclear Societies in Israel, Tel-Aviv, February 1986.  
(with Y. Zvirin and E. Elias).
4. "The Relation between the Sputtering Temperature and the Solid-Liquid Contact Angle".,  
The Annual Meeting of Mechanical Engineering in Israel,  
Tel-Aviv, June 1986.  
(with Y. Zvirin and E. Elias).
5. "The Effect of Precursory Cooling on the Rewetting of a Solid Cylinder",  
The Annual Meeting of the Nuclear Societies in Israel,  
Haifa, December 21-22 1987.
6. "The Effect of the Heat Source in the Solid on the Rewetting Velocity",  
2nd UK National Heat Transfer Conference, Glasgow, Sept. 14-16 1988.  
(with Y. Zvirin and E. Elias).
7. "Rewetting Phenomenon in MTR During ECCS Operation",  
The Nuclear Societies of Israel 15th Annual Meeting, March 13 1989, Ben-Gurion University of the Negev, Beer Sheva, Israel.  
(with A. Nagler and E. Elias).
8. "Two Fluid Model for Critical Two-phase Flow",  
The Nuclear Societies of Israel 15th Annual Meeting, March 13 1989, Ben-Gurion University of the Negev, Beer Sheva, Israel.  
(with R. Dagan, E. Elias and E. Wacholder).
9. "The Impact of Pumped Energy Storage on Lower Reservoir Aquatic Ecology - A Review of Species Dynamics and Control",  
Proceedings of the 9<sup>th</sup> Miami International Congress on Energy and Environment, 1989, USA.  
(with P. Vadasz).

10. "A Homogeneous Non-Equilibrium Two-Phase Critical Flow Model for the Analysis of Supersonic Jet Flow",  
The 9th International Heat Transfer Conference, Jerusalem, 1990.  
(with S. Dickman, E. Elias and E. Wacholder).
11. "Top-Spray Rewetting in a Narrow Rectangular Channel with Precursory Cooling",  
The Annual Meeting of Mechanical Engineering in Israel, June 1990,  
Haifa, Israel.  
(with A. Nagler and E. Elias).
12. "A Two-fluid Model for Two-Phase Flow in Tubes",  
Transactions of the Nuclear Societies of Israel, December 17-18, 1990, Herzliya,  
Israel.  
(with R. Dagan., E. Elias and E. Wacholder).
13. "An Analytical Solution to a Bubble Growth Problem",  
Transactions of the Nuclear Societies of Israel, December 17-18, 1990, Herzliya,  
Israel.
14. "Top-Spray Rewetting of a Narrow Rectangular Channel",  
Int. Conference on Multiphase Flows, September 24-26, 1991, Tsukuba, Japan.  
(with A. Nagler and E. Elias).
15. "A Two-Fluid Model for Critical Flashing Flows in Pipes"  
Int. Conference on Multiphase Flows, September 24-26, 1991, Tsukuba, Japan.  
(with R. Dagan, E. Elias and E. Wacholder).
16. "Heat Conduction in Reactor Fuel Elements",  
Proceedings of the 17th Conference of the Nuclear Societies of Israel, May 4,  
1992, Beer Sheva, Israel.  
(with E. Wacholder).
17. "On the Control Volume Finite Element Method-Treatment of Convection",  
Proceedings of the 17th Conference of the Nuclear Societies of Israel, May 4,  
1992, Beer Sheva, Israel.  
(with S. Dickman, E. Wacholder and E. Elias).
18. "Compressed Air Energy Storage in an Aquifer (CAES)",  
The 24th Israel Conference on Mechanical Engineering, May 18-19, 1992, Haifa,  
Israel.  
(with I. Shnaid and S. Brokman).
19. "On the Control Volume Finite Element Method",  
The 24th Israel Conference on Mechanical Engineering, May 18-19, 1992, Haifa,  
Israel.  
(with S. Dickman, E. Wacholder and E. Elias).

20. "Nonsteady Air Flow from a Well in Porous Media",  
The 25th Israel Conference on Mechanical Engineering, May 25-26, 1994, Haifa, Israel.  
(with I. Shnaid).
21. "An Analytical Solution to a Problem with Position Dependent Heat Transfer Coefficient",  
The 25th Israel Conference on Mechanical Engineering,  
May 25-26, 1994, Haifa, Israel. (with E. Elias).
22. "2-D Conjugate Heat Transfer in Fluids with an Arbitrary Fully-developed Velocity Distribution",  
Proceedings of the 10th International Heat Transfer Conference, August 14-18, Brighton, England.  
(with E. Elias).
23. "Rewetting of a Finite Rod with an Arbitrary Space-Dependent Heat Transfer Coefficient",  
Proceedings of the 18th Conference of the Nuclear Societies of Israel, November 28-29, 1994, Tel-Aviv, Israel.  
(with E. Elias).
24. "CFD Modeling of the Energy Tower",  
Proceedings of Fluent 1996 European User's Group Meeting,  
May 20-21, London, UK.  
(with E. Moses and M. Toren)
25. "Periodical Gas Flow Around a Well in Porous Media",  
Proceedings of the 26th Conference on Mechanical Engineering,  
May 21-22, 1996, Haifa, Israel.  
(with I. Shnaid)
26. "Solution of the Porous Media Equation for Isothermal Gas Flows by Eigenfunction Expansions",  
Proceedings of the 26th Conference on Mechanical Engineering,  
May 21-22, 1996, Haifa, Israel.
27. "Quenching of Hot Oxidizing Surfaces",  
The 27<sup>th</sup> Conference on Mechanical Engineering, May 19-20, 1998, Haifa, Israel  
(with A. Davidy and E. Elias).

28. "Solution of Burger's Equation by Eigenfunction Expansions",  
The 27<sup>th</sup> Conference on Mechanical Engineering, May 19-20, 1998, Haifa, Israel.
29. "Potential Impact of Pumped Energy Storage on the Lower Reservoir  
Aquatic Ecology", The USA-RSA Bi-National Energy and Environment  
Workshop, June 8-12, 1998, Durban-Westville, South Africa.
30. "Heat Transfer Regimes for Free Convection in Porous Media",  
International Heat Transfer Conference, August 23-28, South Korea, 1998  
(with P. Vadasz).
31. "Feasibility Study of Energy Towers via CFD Analysis",  
International Heat Transfer Conference, August 23-28, South Korea, 1998  
(with E.J. Moses and M. Toren).
32. "Multiphase Flow and Heat Transfer", Proc. Of the Fourth International  
Symposium, Xi'an, China, August 22-24, 1999.  
(with A. Davidy and E. Elias)
33. "Quenching of Hot Oxidizing Surfaces", Ninth International Topical Meeting on  
Nuclear Thermal Hydraulics (NURETH-9), to be presented in San Francisco,  
California, October 3-8, 1999.  
(with A. Davidy and E. Elias)
34. "Fuel Rods Quenching with Oxidation and Precursory Cooling", Proceedings of  
the 20<sup>th</sup> Conference of the Nuclear Societies in Israel, Hyatt Regency Hotel, Dead  
Sea, Israel, December 20-21, 1999.  
(with A. Davidy and E. Elias)

## Reports:

1. "Analytical Models for the Rewetting of Hot Surfaces", Paul Scherrer Institute (PSI) Report No. 17, October 1988, .Wuerenlingen and Villigen, Switzerland.
2. "Estimation of Capital and Energy Costs for an Air Piping System", Israel Electric Corporation Ltd., Report No. RM-663, January 1989, Haifa, Israel.  
(with P.Vadasz)
3. "The Impact of Pumped Energy Storage on Lower Reservoir Aquatic Ecology: Review of Species Dynamics and Control", Israel Electric Corporation Ltd., Report No. RM-668, November 1989, Haifa, Israel.
4. "Modelling of Thermohydraulic Emergency Core Cooling Phenomena",  
(with G. Yadigaroglu, M. Andreani, S.N. Aksan, M.J. Lewis, G.Th. Analytis, and D. Luebbesmeyer).
5. "Heat Transfer in a Hydrodynamically Fully-Developed Channel Flow with an Arbitrary Velocity Distribution", Israel Electric Corporation Ltd., Report No. RM-685, April 1991, Haifa, Israel.
6. "Compressed Air Energy Storage (CAES) in an Aquifer: Model Evaluation and Analysis", Israel Electric Corporation Ltd., Report No. RM-692, September 1991, Haifa, Israel.  
(with I. Shnaid and S. Brokman).
7. "Analytical Solution to the Lotka-Volterra Model of Multispecies Dynamics", Israel Electric Corporation Ltd., Report No. RM-696, December 1991, Haifa, Israel.
8. "Compressed Air Energy Storage - The Mount Sodom Project", Israel Electric Corporation Ltd., Report No. RM-719, May 1993, Haifa, Israel.  
(with S. Brokman), in Hebrew.
9. "Compressed Air Energy Storage (CAES) in an Aquifer - Transient Air Flow Around Wells", Israel Electric Corporation Ltd., Report No. RM-716, October 1993, Haifa, Israel.  
(with I. Shnaid).
10. "Natural Gas Storage",  
Israel Electric Corporation Ltd., Report No. RM-736, June 1994, Haifa, Israel.  
(with S. Brokman), in Hebrew.
11. "Salt Caverns for Compressed Air Energy Storage in Israel",  
Israel Electric Corporation Ltd., Report No. RM-741, August 1994, Haifa, Israel.  
(with S. Brokman and D. Weiner).
12. "Salt Caverns for Compressed Air Energy Storage in Israel",  
Israel Electric Corporation Ltd., Report No. RM-741, September 1994, Haifa,

Israel, in Hebrew.

13. “Alternatives for Regulating Natural Gas Storage”, Israel Electric Corporation Ltd., Report No. RM-749, December 1994, Haifa, Israel.  
(with S. Brokman), in Hebrew.
14. “Numerical (CFD) Simulation of the Buoyancy Driven Flow Field Induced by Evaporation”, Israel Electric Corporation Ltd., Report No. RM-784, September 1996, Haifa, Israel.  
(with E. Moses and M. Toren).
15. “Numerical (Computational Fluid Dynamics) Simulation of the Energy Towers”, Israel Electric Corporation Ltd., Report No. RM-788, November 1996, Haifa, Israel.  
(with E. Moses and M. Toren).
16. “Thermodynamic Characteristics of LNG Production by Once-Through-Apparatus for Gas Liquefaction”, Israel Electric Corporation Ltd., Report No. RM-787, September 1996, Haifa, Israel.  
(with I. Shnaid, G. Meron and D. Weiner).
17. “Numerical (Computational Fluid Dynamics) Simulation of the Energy Towers”, Israel Electric Corporation Ltd., Report No. RM-788, November 1996, Haifa, Israel.  
(with E. Moses and M. Toren).
18. “Techno-Economics of Compressed Air Energy Storage (CAES) Power Plant at Mt. Sedom”, Israel Electric Corporation Ltd., RN-796, 1996, Haifa, Israel.  
(with I. Shnaid, D. Weiner and G. Meron)
19. “Numerical Simulation (CFD) of Water Waves Motion in an Open Channel”, Israel Electric Corporation Ltd., Report No. RM-798, January 1997, Haifa, Israel.  
(with E. Moses and M. Toren).
20. “Three Dimensional Modeling of a Rotating Double Blade Propeller”, Israel Electric Corporation Ltd., Report No. RM-799, January 1997, Haifa, Israel.  
(with E. Moses and M. Toren).
21. “Steady States and Transients in Gas Pipelines”, Israel Electric Corporation Ltd., Report No. RM-807, July 1997, Haifa, Israel.  
(with S. Brokman).
22. “Numerical (Computational Fluid Dynamics) Simulation of the Energy Towers – Pilot Plant”, Israel Electric Corporation Ltd., Report No. RM-809, 1998, Haifa Israel.

(with B. Abbou and E. Moses).

23. "Flywheel Energy Storage", Israel Electric Corporation Ltd., Report No. RM-817, July 1998, Haifa, Israel.
24. "The Report of the Inter-Divisional Team Regarding the Criteria for R&D Work", Israel Electric Corporation Ltd., July 1998, Haifa, Israel.  
(with G. Meron, R. Ronen, I. Rot Levi, A. Firstman, C. Ben-Haim and D. Laredo).
25. "Heat and Fluid Flow due to a Rotating Sliced Cylinder", Israel Electric Corporation Ltd., Report No. RM-820, September 1998, Haifa, Israel.  
(with E. Moses).

and

**About 150 commercial classified reports in the framework of J-ROM Ltd.**

## **Management Experience:**

|              |  |
|--------------|--|
| 2001-present | Joint Manager J-ROM Ltd.   |
| 1995-2001    | Manager Energy Storage and Computational Mechanics Group, Energy Technology Development Department, Planning Development and Technology Division, Israel Electric Corporation. |
| 1976-1977    | Deputy Workshop Manager in the Israeli Navy.   |