



INTRODUCTION

Sea Shore Rosen Engineering Consultants was founded in June 2014, by Sergiu Dov ROSEN, a registered and licensed professional civil engineer, with more than 45 years of professional experience, following his retirement as emeritus scientist from Israel Oceanographic and Limnological Research (IOLR). There he worked for 25 years, during which he served as senior scientist and since 2000, Head of the Department of Marine Geology and Coastal Processes. Prior to 1990, Rosen worked from 1981 to December 1989 as the Chief Engineer of the Israel Coastal and Marine Engineering Research Institute (CAMERI), jointly owned by the Technion Israel Institute of Technology and the Israel Ports Development and Assets Company Ltd. (IPC). From 1978 to 1980 he worked as a senior engineer at the same place and from 1971 to 1978 was employed as research engineer at the Technion Research and Development Foundation Ltd. In addition, from 1993 to 2006, Rosen founded, owned and managed Sea-Shore-Rosen Ltd., which carried out a number of coastal and marine engineering projects, of major national importance.

AREAS OF EXPERTISE AND ACTIVITY

- **Sea Shore Rosen Engineering Consultants** has been engaged in planning, consulting and engineering supervision on coastal engineering, port engineering, marine engineering and environmental engineering projects. As a general rule, our approach is to constantly search for optimal planning and engineering solutions that will ensure performance and quality over extended time, while saving costs, for example by submitting innovative and often original ideas, based on the extensive knowledge and experience accumulated by Eng Rosen, as well as by using his scientific and professional communities' extensive connections, throughout the world.
- **Sea Shore Rosen Engineering Consultants** constitutes the business licensed activity of Eng Rosen. Mr. Rosen holds a Bachelor of Science degree (1971) and a Master of Science degree (1981), both in Civil Engineering from the Faculty of Civil Engineering at the Technion, Israel Institute of Technology. Mr. Rosen studied also for a Ph.D. in the same faculty, successfully passed the candidacy examination for protection of his Ph.D. thesis, but did not complete it, due to his decision to enter the business field. Eng. Rosen performs his activities in planning, consulting and/or supervision according to the needs of the projects, together with external consultants and/or assistants, to cover all aspects required (such as marine architecture, marine biology, economics, law, etc.). Below and on next page is a more detailed list of the areas of our expertise and activity:
 - ☉ **Beaches** - protection against erosion, development, extension and rehabilitation of beaches, reclamation, sand bypassing, analysis of hydrodynamic and sedimentological coastal processes.
 - ☉ **Fixed and floating breakwaters** - design, repair, and environmental impact assessments.
 - ☉ **Marine structures** above, at or below sea level - design, stability analysis and cost appraisals.
 - ☉ Planning of **ports, marinas, piers, wharves and quays**.
 - ☉ Design of **artificial islands** and **marine platforms** (floating, TLP, piled).
 - ☉ Planning of marine outfalls and seawater intake suction heads and pumping sumps facilities for desalination, including marine piping, taking into account various aspects such as meteo-marine climate, sea bottom and sub-bottom soil properties, soil liquefaction, marine fouling, jellyfish, biotic aspects, etc.
 - ☉ Planning, analysis and optimization of **mooring, fendering and anchoring systems** of vessels and other floating bodies (including fish cage farms), to reduce load forces and movements.
 - ☉ **Environmental surveys** and **environmental impact assessments and statements**.
 - ☉ **Legal expertise** and **legal consultations**.



PROFESSIONAL EXPERIENCE

- Among the most important engineering projects that Eng Rosen dealt with till 1990 (1971-1989), he quotes the following: Development of Hof Atarim detached breakwater system at the Atarim beach in Tel Aviv; The Marina City project for marine development in the Tel Aviv port area including an Offshore Airport in front of the Tel Baruch coast; Research in a 3D Physical Model for Ashdod Port Container Quay 9 and for the Ashdod Port Bulk Carriers Phosphate Loading Terminal, carried out at the Danish Hydraulics Institute (D.H.I), using irregular waves and moored ship models and mooring and fendering systems models; Management of the marine research study for assessing the feasibility of coal unloading sufficient operability at an offshore coal unloading terminal at Hadera, testing 8 major terminal layout and structure alternatives and for the optimization of the selected alternative – an open structure unprotected pier for the unloading of coal in Hadera in the open sea, the first of its kind in the world. The study was performed at CAMERI basin, after prior selecting and managing the purchase of the equipment, assimilation of technology and knowledge from DHI at the Technion); Feasibility and optimization studies for the expansion of the Port of Ashdod (HaYovel Port) using wave disturbance 3-D moored vessels model and 2-D and 3-D breakwater stability physical models with irregular waves. The 3-D and then 2-D breakwater stability models also included the proposal and proof testing for structural repair of the existing main breakwater, discovered during the tests to be at the verge of collapse after extensive breakage occurrence of its tetrapods armour layer, related to be due to its design using a too low ultimate design wave height. The solution proposed and proven by the tests and afterwards in the field saved more than a hundred millions of dollars; Investigation of the reasons for the development of a marine gully opposite mid sector of the main breakwater of the Rutenberg power station at Ashkelon, and further advising the Israel Electric Corporation on the repair of damage encountered to half of the main breakwater due to wave focusing and sediment processes by the gully; A number of classified projects for the Israel Navy and IAI in the marine domain of vessels, ports, marine structures and marine activity.
- Among of the activities of Eng. Rosen at the National Institute of Oceanography of IOLR (1990 - July 2014), one of the most important projects, which he led for 20 years was the establishment and management of the international monitoring system in the Mediterranean and the Black Sea of sea level changes due to climate change (MedGLOSS) upon personal appointment by the IOC/UNESCO Secretary General and by the CIESM Director General; Other major activities were: Establishment of a monitoring system for the Israel marine environment (waves, currents, wind, sea level, sea temperature, etc.) at the offshore tips of the coal unloading piers at Hadera (December 1991) and Ashkelon (August 2012). Determination of the long term sedimentological regime at the Israeli coast in the Mediterranean and recommendations on the management policy of the coastal sand reservoir; Leadership of the environmental studies on behalf of Israel in the bi-national Israel - The Netherlands feasibility study of artificial islands at the Mediterranean coast of Israel (including sedimentological and meteo-marine field data gathering and analysis, sedimentological numerical modeling specifications, supervision of Delft Hydraulics modelling and independent outcome assessment); Consultations to the Planning Division of the Ministry of the Environment regarding plans for the construction of marinas at Haifa, Ashkelon, Ashdod, the Yarkon and Herzliya. Joint study with Egypt and USA on the sedimentological regime in the Nile littoral cell; Multi-annual monitoring of the meteo-marine and sedimentological changes at the coastal cliffs and beaches of the Israel coast as continuation studies of the islands feasibility study; A meteo-marine and sedimentological study for the Coastal Management Policy Document; Performance of maritime data analysis and modelling research serving as input for the policy document dealing with the collapse of the coastal cliffs along the Mediterranean coast of Israel.



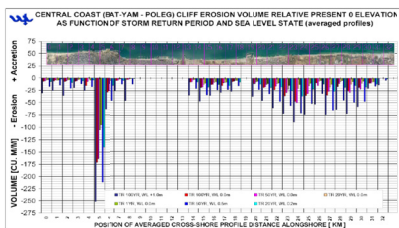
- Mr. Rosen performed a detailed design and construction supervision of an oceanographic floating platform for monitoring of the Dead Sea; Managed and performed the marine parts of four EIAs related to the development of the Haifa Port (the eastern pier, the partial expansion of the port, the deepening of the entrance channel and the Bay Port); and the sedimentological study of the environmental impact assessment of the port of Ashdod planned expansion; Led the preparation of a second opinion environmental and coastal engineering expert consultation on the development of the IPC ports in Israel for 2055 and beyond, for the IPC, conducted numerical model studies simulating the impact of tsunamis on the Israeli coast under various scenarios and acted as member of the experts group of the GLOSS programme of IOC/UNESCO; Performed astronomic tide forecasts for the coasts of Israel and abroad including software development and use training to African and European countries; Has been acting as head of the Israeli delegation to the Intergovernmental Coordination Group (ICG) for the establishment and operation in the North East Atlantic, the Mediterranean and connecting seas of a tsunami early warning system (NEAMTWS) of IOC/UNESCO since its establishment in November 2005, including also acting as Chair of ICG WG3 for sea level and deep sea data sharing for NEAMTWS and member of the ICG Steering Committee. Mr. Rosen also served as member of a number of Inter-Ministerial Committees: Determining the position of the statutory coastline; Policy document for dealing with the collapse of the coastal cliffs; Preparedness for tsunami in Israel, including establishment of an early warning system from tsunami; Examination of the feasibility of building artificial islands for infrastructures. He also provided professional consultancy to the Ministry of the Environment (Planning Department), Ministry of Defense (Israel Navy), Ministry of National Infrastructures and the Natural Gas Authority, Ministry of Transport (Israel Ports Company), and Ministry of Agriculture and Village Development (Department of Fishery and Aquaculture).
- Private activities (1993 - 2014 via **Sea-Shore-Rosen Ltd.** and since June 2014 via **Sea Shore Rosen Engineering Consultants**) include also major national engineering projects: Siting of intakes for desalination plants north to Haifa coast for Mekorot Israel National Water Co. and detailed design of a new intake at Elat; Ashkelon Desalination Plant marine part development (world largest at the time), including coastal, hydraulic and environmental engineering consulting for the intakes and sump siting, marine part tender documentation (including specifications and bill of quantities) and supervision of the detailed design and construction for OTID group (Vivendi +IDE); Ongoing consulting to Ministry of Defense on tsunami (National Emergency Management Authority), Consulting to Ministry of Transport (Israel Ports Company on Haifa Port development and to Shipping and Ports Authority on marina operation and developments), to Ministry of Agriculture and Village Development (Department of Fishery and Aquaculture on marine fish cage farms damages in past storms and improved design criteria and location); Other consultations have been provided to municipal development companies (Netanya, Bat Yam, Ashdod) and to Israel Land Authority.
- **Sea Shore Rosen Engineering Consultants** has also been involved in the development and coastal and marine engineering design of large projects such as the construction of an extensive marine development off Jaffa coast, including a modern fishing port and passenger hydrofoil wharves and development of new beaches in the reclaimed land; Plans for an environmentally friendly marina and developing protected beaches at Bat-Yam; Preliminary design for an extensive reclamation in Haifa Bay and another one off Haifa coast; Via **Sea Shore Rosen Engineering Consultants** since 2014, and before via **Sea-Shore-Rosen Ltd.**, Mr. Rosen has prepared jointly with **Hugo Marom Aviation Consultants Ltd.** a number of coastal engineering preliminary designs for offshore island reclamations for offshore airport construction, including additional infrastructures and for residential use off the Mediterranean coast of Israel.



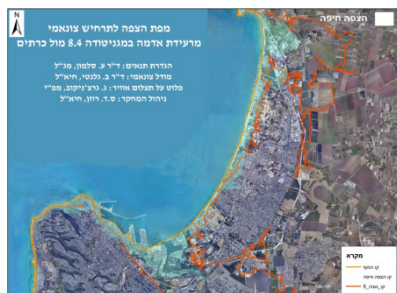
SAMPLE PROJECTS OF ENG. ROSEN'S ENGINEERING AND ENVIRONMENTAL ACTIVITIES



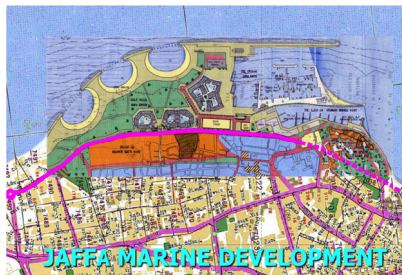
Hadera Coal Unloading Pier



Coastal cliffs Retreat Study



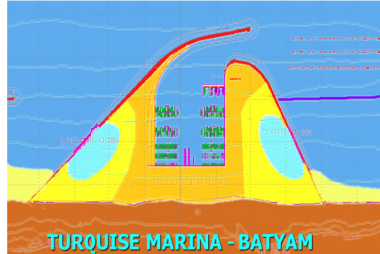
Tsunami Impact Study, Haifa



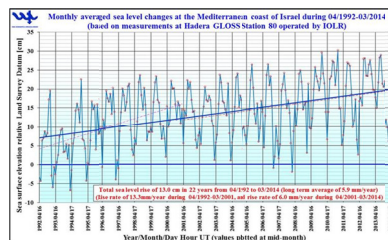
Reclamation off Jaffa Harbour



Platform Design at Dead Sea



Turquoise Bat-Yam Marina



Israel Sea Level Rise Monitoring



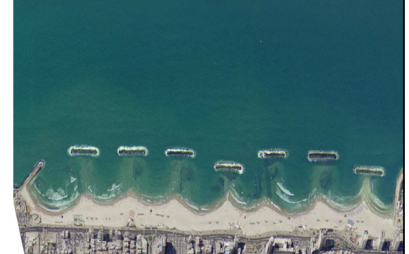
Future Ports Master Plan



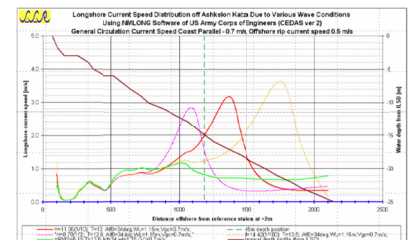
Intake Pipes Laying, Ashkelon



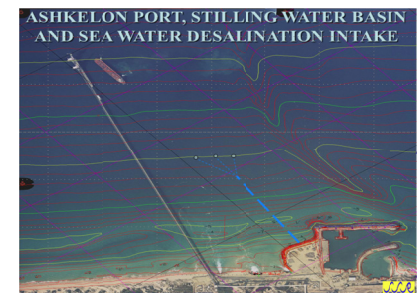
Delegate at ICG/NEAMTWS



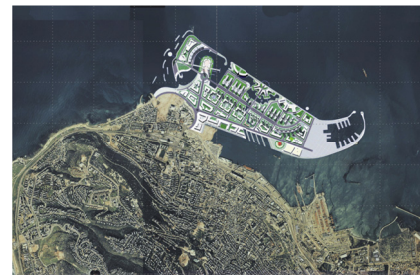
Tel Aviv Atarim Development



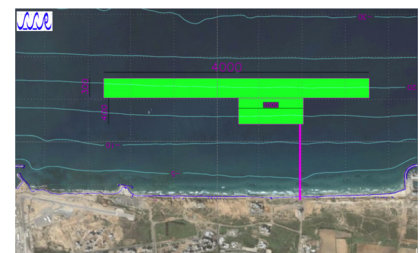
Ashkelon Intakes Loading



Projects for Ashkelon Port Area



Reclamation Design off Haifa



Offshore Airport off Tel Baruch