A Pioneer of Offshore Oil & Gas Structures

William "Bill" Matthew Martinovich, S.E.

1930 – 2013

This article is about Bill Martinovich and it is a story about the evolution of engineering ocean structures. Oil and gas reserves were discovered offshore and Bill's structure engineering career parallels the evolution and development of the offshore oil and gas exploration and production industry. Bill was a pioneer and a technical leader in the science and engineering of floating exploration vessels and fixed oil and gas production structures. Bill joined SEAOC in 1961, was elevated to SEAONC Life Member.

Bill died on June 5, 2013. He was born in San Francisco in 1930, attended Balboa High School, and received his Masters of Science in Structural Engineering and Structural Mechanics from the University of California at Berkeley. Bill swam for the Balboa High School swim team and was a lifeguard at Fleischhacker Pool; a very large, salt water, swimming pool that was located near the Pacific Ocean in San Francisco. While studying engineering at Cal, he played water polo on the Cal team. In the 50's he was among the early pioneers of surfing the big, cold, waves at San Francisco Ocean Beach. He continued hunting those waves along the California coast throughout his life. He was a lifelong fitness swimmer and was involved in his weekly swim routine the day he passed away.

Bill received his Bachelor of Science degree and was elected to the Tau Beta Pi Engineering Honors Society in 1952. After graduating from Cal, he went to Southern California to work in the aircraft manufacturing industry. This was closer to warmer ocean water and waves for his surfing passion. He served as a Lieutenant in the Navy and after his military service he returned to UC Berkeley for his Master of Engineering studies in structural engineering. After graduation, he joined Earl & Wright Consulting Engineers in San Francisco as a staff engineer. He ultimately rose to be the President of the firm. His early career at Earl & Wright involved engineering construction rigging, shoring, equipment, and temporary methods for large construction companies that were building the major bridges in San Francisco Bay and throughout the country. His career at Earl & Wright rode the wave of increasingly challenging and complex engineering, research and development of floating offshore oil and gas field exploration and oil production vessels and structures.

Standard Oil of California, now Chevron Oil Company today, used Earl & Wright to furnish the engineering for the structure, fabrication, and installation of Platform Hazel, off the coast of Carpenteria, California in 1959. This tubular steel structure was towed floating horizontal and tilted up using sequential ballasting of watertight compartments in the structure. Signal Oil & Gas ordered Platforms Hope, Heidi, and Emmy for producing oil off the cost of Huntington Beach. The ocean water depth at these sites was under 100 feet.

The near shore exploration for oil and gas used buoyant platforms, with broad bases that were towed over the potential reserve, and ballasted with seawater to rest on the bottom while drilling the wells. Fixed platform structures with production modules on top would be constructed over the wells that demonstrated large oil or gas reserves. Stiffened steel plate and circular steel shells like in ship construction, and large diameter steel pipes were the primary structure members used for early offshore structures. Naval architecture, structures subjected to high winds, waves, and earthquakes are part of the "Design Criteria" for ocean structures.

In 1963, the Kaiser – McDermott had the Design- Build contracts for Shell Oil and Chevrons' Cook Inlet, Alaska offshore leases. They used Bill Martinovich and Earl & Wright to design and install these production platforms. According to Webb Hayes, Earl & Wright President, Bill's swimming skills served him well when he was knocked into the freezing Cook Inlet water by cables that had come loose as he was stepping from the heaving work barge to the access ladder on the platform. The barge crew threw him a life vest and then a rope. In that moment he had to decide what to reach for. If he had grabbed the life vest he would have been pulled away by the current and died a chilly death. Instead he grabbed the rope and held tight. "Fortunately," Webb recounted, "the barge crew was very quick in fishing him out of that frigid water."

Deepwater drilling dictates that exploration drilling operations be carried out from a floating vessel. Drill ships heave, pitch and yaw with each passing wave, and the industry needed more stable drilling platforms. A semi-submersible obtains its buoyancy from ballasted, watertight, pontoons located below the ocean surface and wave action. The semi-submersible concept obtains its buoyancy from ballasted, watertight, pontoons located below the ocean surface and wave action. Its stability comes from large diameter caissons located around the perimeter. The operating deck is located above the tops of the passing waves, and those caissons and structural columns connect the pontoons and operating deck. In operation at deep draft, it motion is greatly reduced, and when the rig moves its location, the pontoons are de-ballasted so the rig pontoons float on the surface.

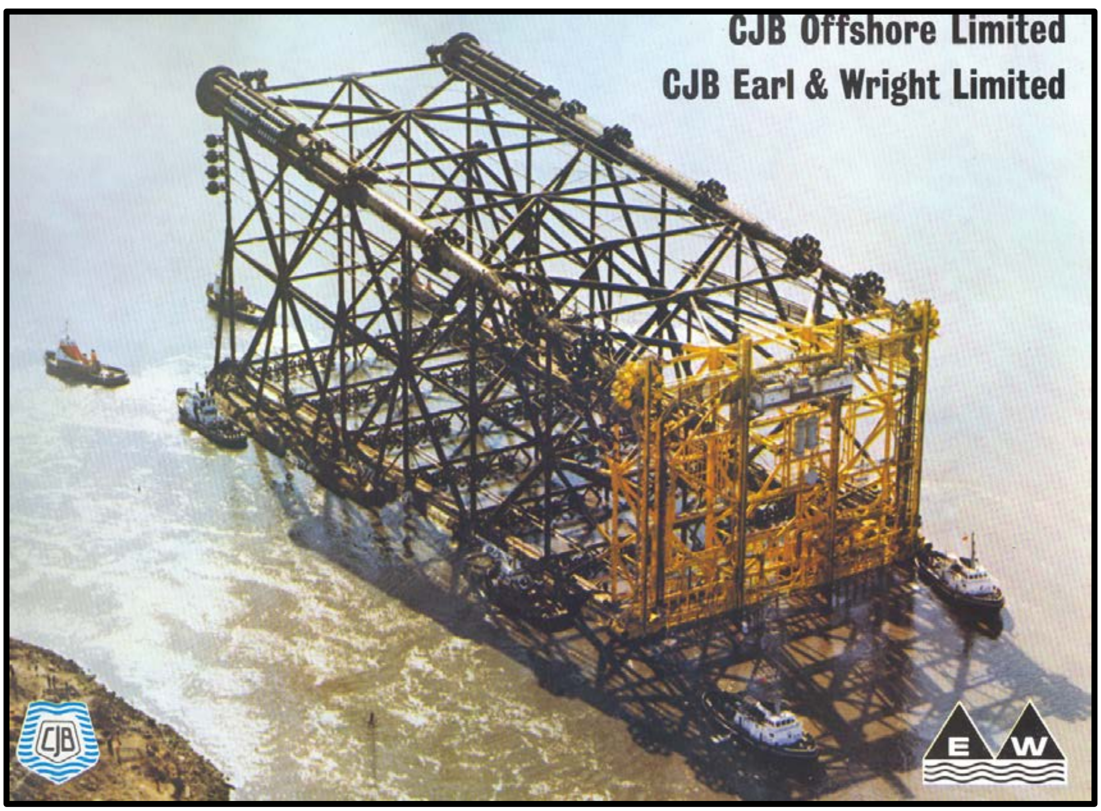
In 1961, Shell Oil successfully converted an existing submersible rig into the first semi- submersible drilling unit for operation in the Gulf of Mexico. First generation semis were used in water depths of up to 600 feet. The industry was moving to develop oil and gas reserves that were discovered beneath deeper and deeper water. The bottom resting exploration platforms were modified to float on the water with positioning anchors and cables to hold position. This was the birth of semi-submersible.

Sedco 706

The Sedco 135 exploration rigs were triangular, with large caissons and buoyant transportation pontoons at each corner. They were designed to either sit on the ocean floor in up to 135 ft. of water, or drill when floating. Seven rigs were being constructed simultaneously, in five shipyards in five countries. The first one completed failed on its maiden voyage, the rig sank, and most lives were lost.   Southeastern Drilling Company in Dallas, Texas, or Sedco, faced ruin, and retained Earl & Wright and Bill to investigate. He looked at the structure configuration and floor plan of the platform, and identified the structure framing arrangement and joint details that appeared weak. Bill's report stated that the structure configuration and resulting high stresses caused structural failure, and caused the vessel to tip, lose stability, and sink. Sedco accepted his report and the remaining six rigs under construction were modified. For future rigs, he changed the floor plan to allow drilling from the center of the rig rather than stern drilling, eliminated the sit-on-bottom work requirement, and reduced the rig overall height.   The owner had Bill design four more rigs, with his modified design, that were constructed and commissioned for offshore work.

This experience led Bill to develop a rectangular floor plan drilling vessel, with four major steel shell caissons supported on twin multiple compartment pontoons. It had improved deck load capacity, and self-propulsion at higher speeds between job sites. This was christened the Sedco 700 rig.   Earl & Wright designed ten more of these rigs in the 70's with Kaiser Steel constructing the 705 and 706 in Vallejo, California. And inevitably, Earl & Wright became part of Sedco.

Bill Martinovich and Earl & Wright established a reputation as a leader in offshore engineering.   In 1971, Bill was the Chief Operating Officer and the principal technical leader of the firm.   The company developed self-floating production platforms that included over 10 meter diameter stiffened steel shell legs.



14,000 hp ocean tugboats move the Thistle Field Platform to the North Sea Oil Production Site

Bill was responsible for over fifty oil and gas production structures engineered at Earl & Wright in the 60's, 70's and 80's including: Maui A Gas Platform, 360 ft. depth, New Zealand, Thistle Field, North Sea, 510 feet depth Ninian, North Sea 540 feet, and Rankine, Western Australia, 560 feet depth, Esso Australia, Tuna & Mackerel Platform Designs, 1972; Shell U.K., North Sea, Platform Auk Deck Structures, 1972, Shell Canada, Eastern Canada, Platform Deck Design, 1970, ARCO, Cook Inlet Alaska, King Salmon & Spark Deck Structures, 1968; Shell, Cook Inlet Alaska, Platform C Deck Structures, 1966.

Typically, the platform structures were built horizontal in a dry dock, the dry dock would be flooded and the 15,000 ton rigs would float on the big legs. Very large ocean tug boats would tow the rigs to the site and a choreographed sequence of opening valves, flooding compartments, and ballasting would rotate the platform to vertical over the final position and ballasting completed. Two-meter diameter, 200 feet long steel pin and skirt piles were driven into the sea floor and grouted into pile sleeves to fix the platform.

Offshore Energy Center Hall of Fame recognized Bill Martinovich for his pioneering work in the development of the Sedco 700 drilling platform. The Hall of Fame recognizes engineers and pioneers that took the industry to sea. The pioneers are individuals who distinguish themselves and become the character of the industry through their vision, drive, innovation and leadership. In 2000, Bill Martinovich, with Earl & Wright Consulting Engineers, a Sedco Company, was inducted into the Offshore Energy Center's Hall of Fame for his pioneering work and contributions in developing floating semi-submersible drilling platform technology and structures:

MOBILE DRILLING UNITS

First & Second Generation Semi-Submersible Drilling Rigs

1966	Sedco 135's	3 footed columns; arranged in a triangular shape
1971	Sedco 700's	Twin pontoon Hulls, 8 columns, and thruster propulsion

author: Reinhard Ludke, S.E
Earl & Wright Engineer 1973 – 1978