THE CONSULTANT

The Newsletter of the IEEE Consultants Network of Long Island

Volume 24, Number 3 *March 2007*

Chairman's Corner — *John Dunn, President, Ambertec, Inc.*

There was a wonderful expression used on The Simpsons some while ago, a reference to a "purple monkey dish washer". The semantic possibilities were a great lesson in how to not be understood. Just which of the following could this phrase refer to?

1) A purple monkey that washes dishes.
2) A device for washing any dishes that are used by purple monkeys.
3) A device that only washes purple dishes that are used by monkeys.
4) A purple device that washes any dishes used by monkeys.

In a similar vein, my son told me that at work, he had to send some pictures to "the printer". Did he mean ink-jet or laser? No, he meant this company in California that does printing services.

As a third example of semantic sin, I found myself in a technical discussion recently where someone offered the observation that "The offset voltage and the bias current affect the Q-point of the op-amp's output and it's too high."

Now, I think that I understood the fellow's meaning from context, but which of the following do you think was really meant?

1) The op-amp's Q-point was too far positive from its intended nominal voltage.
2) The op-amp's offset voltage was too large.
3) The op-amp's bias current was too large.

This kind of thing makes me think that the word "it" should be banned from technical discussions because the "i-word" is an indefinite article and oh boy, can it ever be indefinite.

I'm sure any of us could come up with more examples of this kind, but let's try not to fall into semantic traps, at least not too often.

Meetings

March 2007

Topic: "A Brief Historical Perspective of Our Profession - Part 2"
Speaker: Jerry Brown, Essex Systems, Huntington, NY.
See page 3 of previous newsletter for speaker biography.
There are many bigger-than-life personalities in the history of our profession and to treat them and the events adequately takes a lot longer than the two meetings that we allocated. We never got to the transistor and microcircuits. We hardly got out of the era when everybody wore hats - even bowlers. Jerry has a lot more to tell us, and he keeps on learning still more. If only the consulting business would stop getting in the way - - -.

April 2007

7:00 PM, Wednesday, April 4, the first Wednesday of the month.
Briarcliffe College, 1055 Stewart Avenue, Bethpage, NY
See website for directions: www.consult-li.com

Topic: Business meeting: Preparation of a New Printed Directory.

Light refreshments will be served. Admission is free (no charge), and no pre-registration is required. For more information, contact Chairman John Dunn at (516)378-2149 or e-mail ambertec@ieee.org.

Other Meetings

Consult the Events Calendars on the Section website: www.ieee.li and the LICN site: www.consult-li.com.

THE CONSULTANT is published monthly by the IEEE Long Island Consultants Network and is available free of charge to its members.
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Deadlines: Flexible
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Bermuda Triangle and Methane Eruptions — *Carl E. Schwab*

In the recent past on the National Geographic cable TV channel, there has been, to me, an interesting attempt to explain a few of the unexplainable losses of ships and aircraft in the Bermuda Triangle (BT).

Originally it was thought that most were lost because somehow the navigation devices, in the BT area became inaccurate. Most of these cases have happened over the last 75 years, many during WWII by training aircraft. Indeed many of these cases were determined to have happened when the pilots became confused.

However, in many other cases, it appeared something happened abruptly and caused aircraft engines to simply stop, pilots to dive into the ocean, and entire ships and boats to simply vanish. Researchers increasingly are considering sudden eruption of methane gas (CH4) to be a significant cause.

This caught my interest as I watched the program because they showed a portion of the ocean floor with series of bubble streams rising out of the floor. The depth was approximately 800 feet and the floor was being observed by an autonomous underwater vehicle (AUV). The dozens of bubble streams were about a foot apart and emitting vigorously. The 800-foot depth would produce a hydrostatic pressure of 25 atm, or 370 psia.

The area indicated was in the northern corner of the BT and quite close to the area known to have huge amounts of CH4 in clathrate form. I have written about this site sometime back in an LICN Newsletter article.

Again using the AUV, the researchers noted many conical craters that they believe were
the result of a CH4 eruption of several tens of cubic meters at the 370 psia. Based upon this assumption the researchers ran some lab tests with scale models to see if such an eruption could in fact sink a ship.

The results are strongly YES. Under the condition of a loaded cargo ship, if the CH4 eruption hit amidships the ship would swamp and sink in a matter of seconds. Indeed there would not be time to radio anyone.

Now the whole process of this bubble bursting the surface and going into the atmosphere lasts less than 5 seconds and the surface quickly goes placid. So if you don't see it happen, you miss it.

As the bubble expands and rises into the air, an aircraft (with a piston engine) flying through it would suffer an "engine out" with immediate loss of power. Depending upon the concentration of CH4 it will cause the altimeter and rate-of-climb to indicate grossly wrong. To kill the engine took less than 3 seconds. The engine used was the radial type that was used in the Grumman TBF in WWII. The TBF was used extensively for training in the BT area during WWII.

How about capturing the CH4?

From my earlier researching on clathration, I was not aware that the CH4 could issue in these bubble streams. I was aware that the Russians nearly lost a ship attempting to recover bubbling CH4 off their north coast. Also apparently the Russian gas company Gazprom recovers a great deal of CH4 from clathrate form and have been doing so since 1960.

As I wrote in another Newsletter, CH4 is almost the perfect fuel for powering stationary facilities such as home and factories, and it is nearly inexhaustible because nature continuously generates it. It is truly **A RENEWABLE ENERGY SOURCE.**

Overfishing — *Richard LaRosa, sealevelcontrol.com*

The April 2007 issue of National Geographic magazine called attention to the depletion of marine life due to over-harvesting of desired species and the waste of the by-catch, the unwanted species caught in nets or hooked on long fishing lines. Tens of millions of sharks are killed each year for shark-fin soup. They are finned alive and left to sink and die. Fishing for once-abundant Icelandic Cod is now severely restricted.

The effects of overfishing extend beyond depletion of the hunted and by-catch species. The depletion of large predatory sharks has allowed the cownose ray to proliferate and gobble up the bay scallops off North Carolina. According to articles in Science 30 March 2007, cownose ray predation on bivalve mollusks has compromised the water-filtering service of the mollusk population.

The seafood industry has resorted to offshore aquaculture to replace some of the depleted species, but there are problems with pollution and infestations of lice. Wild salmon, attempting to reach the ocean, have been turned back upstream by attacks from lice coming from offshore aquaculture cages. John Sackton has been in the seafood industry for 30 years and is the founder of www.seafood.com news. He wrote an article in the March 2007 Sea Technology in favor of aquaculture, making a tacit assumption that environmental concerns will be addressed by the industry.

Aquaculture includes using purse-seine nets to catch large fish like bluefin tuna in the Mediterranean and herd them into fattening pens. Purse seiners are ships especially built to deploy the nets around a school of fish and then close them and transfer the fish to the fattening pen, or some other receptacle. These ships might combine differently-sized engines in their propulsion systems to maximize their fuel economy.

One remedy for overfishing is to develop a more frugal and ethical mind-set wherein ocean resources are managed responsibly. Given the greed and hunger that prevails in the world, this may be wishful thinking. However, the National Geographic article describes some progress in creating marine reserves.

Another possibility is to increase the productivity of the oceans through the use of ocean-powered pumps that bring cold water up from 1000-m depth and distribute it at the surface. Algae and phytoplankton contain chlorophyll and float in the euphotic zone - the top ocean layer, where the sunlight intensity is sufficient for photosynthesis to create organic material in excess of what is consumed by respiration. Nitrate and phosphate ions are the macronutrients required for photosynthesis. They come from dead organic matter that decays on the sea bottom. Photosynthesis is a complicated process that proceeds in small energy steps. Minute quantities of the micronutrient iron are required to facilitate photosynthesis. Below 1000-m depth, the respective concentrations of these macro- and micronutrients are approximately uniform. The concentrations of N, P, and Fe are about 21 μM, 5 μM, and 0.8 nM, respectively. (1 M means one gram atomic weight of the element in one liter of water solution.) At high latitudes during the winter, there is less solar heating of the surface, so there is less stratification and more vertical circulation. Also, winter storms tend to stir the water so these nutrients reach the surface. In the spring, the phytoplankton become more active and the nutrients are consumed during the summer. In the tropics, the surface concentration of nutrients is low throughout the year.

The ocean-powered pump requires warm surface water to evaporate the heat engine working fluid (probably ammonia) in the evaporator heat exchanger. The pumps would have to be located in the tropical ocean where the concentration of nutrients at the surface has always been low. Thus a new portion of the world ocean would become productive, with interesting and hopefully beneficial results. This geographic shift in ocean productivity must be studied to be sure that there are no bad effects.

It should be noted that aquaculture uses plant and animal material from the land and sea to feed the penned fish. It does nothing to increase the photosynthetic primary production. On the other hand, upwelling of ocean nutrients directly increases this primary production and it extends photosynthesis into the underutilized tropical ocean. This is important because only a small fraction of Earth's surface is covered with arable land, and this is increasingly being used to produce fuel instead of food. Upwelled nutrients can extend photosynthetic production into vast areas of the world ocean to increase our food supply.