THE CONSULTANT

The Newsletter of the IEEE Consultants Network of Long Island

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

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Art History is a dreaded but required subject for all college Art Majors, both at the Bachelor's level and at the Masters level. It is universally deemed in that field of endeavor, that one cannot be considered a true professional unless one has at least a passing knowledge of which artists and which cultures did what, when did they do it and within what social and political circumstances.

It's not good enough just to be able to put paint on a surface, to carve something up or to put pieces of heaven knows what together and hope for gallery exhibit space and/or accolades at some prestigious museum.

Consider now, the following names (some genuflection will, of course, be acceptable): Alessandro Giuseppe Antonio Anastasio Volta, André-Marie Ampère and Georg Simon Ohm.

I kinda think these fellows had something important to tell us, but I must confess that I never had any formal instruction in their lives, their times or their works. For lack of that, I feel cheated because in engineering curricula, there is no equivalent study of Art History, call it what, Science History? I think there should be.

The best engineers whom I have known have all had at least a passing knowledge of the people who laid down the foundations of our profession. Also in my experience, the best engineers have always held these giants in high esteem and respect.

Interestingly too, most of the lesser lights whom I have seen practicing (masquerading?) as engineers showed not the slightest bit of interest in that history. One really sad case was not even aware that our familiar units of measure had been named in honor of these great individuals.

I submit that it would be an uplift to professional training if this gap in the engineering education were to be filled.

Meetings

October 2006

The following slate of officers was nominated for 2007:

Chairman - John Dunn
First Vice Chairman - Jerry Brown
Second Vice Chairman - Sam Sadinsky
Treasurer - David Rost
Secretary - Dick LaRosa

Nominations will be opened at the November meeting.
We will vote at the December meeting.

November 2006

7:00 PM, Wednesday, November 1, the first Wednesday of the month.
Briarcliffe College, 1055 Stewart Avenue, Bethpage, NY
See website for directions: www.consult-li.com

Additional nominations for 2007 officers will be accepted.

The meeting topic will be a presentation and discussion of contract-related anecdotes and problems. Examples are incidental damage, indemnification, and hold harmless clauses. The topic was to have been "Contracts with a Bite," and this may be included, depending on how well Irwin Weitman has recovered from his injury. Irwin has our best wishes, and we wish John Dunn a steady recovery from his operation.

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.

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Loop Current Guide — *Dr. Richard LaRosa, sealevelcontrol.com*

The Loop Current Guide is one of three projects intended to reduce hurricane intensity, combat global warming, and provide fresh water. The second project involves pumping cold sea water up from the ocean bottom and distributing it at the surface in order to reduce hurricane intensity, ice sheet melting, and high surface temperatures caused by global warming. The pump power is to be supplied by ocean thermal energy conversion (OTEC). This has been discussed in the newsletter and was presented at the LISAT conference earlier this year. The system must be redesigned to increase the efficiency of the thermal cycle and reduce the size of the heat exchangers. The third project is to consider using OTEC to provide power to operate reverse osmosis desalination plants. If these are floating in the ocean, we have the problem of transporting the water to shore and distributing it. This seems like an insurmountable obstacle, so it is necessary to start looking for a solution. The rest of this article deals only with the Loop Current Guide.

Water that enters the Gulf of Mexico from the Yucatan Passage hardly ever goes directly to the Florida Straits. Instead, the current intrudes into the Gulf in a northwest direction, reaching almost to New Orleans. It makes a clockwise turn and then exits the Gulf via the Florida Straits. The path is a loop, from which the Loop Current gets its name. Warm water is swept into the interior of the loop by the Coriolis force. The Coriolis force acts at right angles to the stream velocity, and in the Northern Hemisphere it moves water to the right of the path. The force is proportional to the velocity, and the warmest water is at the surface where it is free to move faster than the deeper water. This is why warm water collects in the interior of the loop. The warm water in this pool can be a few hundred meters deep because it is less dense than the cooler water on the outside of the loop. Hence the taller warm water column exerts the same pressure on the bottom as the shorter column of cooler and denser water. The location of the warm water can be revealed by satellite radar altimeter mapping of the sea surface height. This deep warm water can supply much latent heat energy to a passing hurricane, which is precisely what happened in the case of Katrina in 2005.

A fence might be able to guide the Loop Current directly from the Yucatan Passage to the Florida Straits and avoid the dangerous accumulation of warm water. In some previous newsletters, the top of the fence (or screen) was assumed to be at the water surface, with some magical means to allow ships to get through. More realistically, as considered last month, the top of the fence might be kept below the maximum draft of ships that must pass over the fence. The Casotte Landing liquefied natural gas (LNG) terminal in Pascagoula, Mississippi must be dredged out to a depth of 42 feet below mean lower low water level, so for a preliminary estimate, we might set the fence at a minimum of 42 feet below the water surface. The old Queen Mary and Queen Elizabeth had a 42 ft draft and they were sometimes forced to wait for the tide to allow them to enter some ports. The modern QM2 and the QE2 have drafts of 32 ft - 10 inches = 10 m. For the initial calculations, a fence top 42 ft below the water surface should allow most ships to pass over the fence.

As stated last month, the fence would make the current turn from its northward direction in the Yucatan Passage to an eastward direction in the Florida Straits. The fence would have a curved portion connected between two approximately straight runs. The curved section would have a radius of curvature of 288 km. Water below a depth of 42 ft (13 m) would exert a centrifugal force on the fence when following this curve. Water above this depth would spill over the fence and follow a path similar to the present Loop Current. The current has a depth of about 800 m, and the velocity varies approximately linearly from zero at the 800 m depth to about 1.8 m/s at the surface. The centrifugal force depends on the square of velocity, so the centrifugal force is very small at the bottom of the fence and increases to a maximum near the top. There is a steep drop in centrifugal force at the top because the surface water is not forced to follow the curved path. This change in centrifugal force with depth results in a vertical pressure gradient which causes a downward flow over much of the fence, and an upwelling at the top of the fence. This upwelling water is entrained in the surface flow over the top of the fence. The water coming from below the fence top is cooler than the surface water, so in addition to greatly reducing the Loop Current intrusion into the Gulf of Mexico, its temperature is lowered.

For the sake of economy and practicality, the screen would not extend down to the full 800-meter depth of the current. The cold, slow water at the bottom of the current would be allowed to pass under the screen and circulate in the Gulf, where it will do no harm. The 13 m overflow layer at the surface is a small fraction of the current that will be guided by the fence and not allowed to intrude in the Gulf. A number of construction details were mentioned last month. This month we add the possibility of vertical mixing that might lower the temperature of the overflow. Perhaps I can find a way to estimate the temperature reduction.