THE CONSULTANT

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

What price do we really pay for power efficiency?

I've heard good words said about LEDs as used in traffic lights. The LEDs give out as much light as the old incandescent lamps while using less electricity to do it. So, since the LED traffic lights are power efficient, I guess they must be a great design.

On the other hand, the LED's optical radiation pattern is quite narrow so that when viewed sufficiently off center, the glow can't be seen anymore.

Thus, while driving southbound on Route 110 in Farmingdale one very windy day, as I came to the LED traffic lights that hang from cables in front of the Telephonics driveway, those lights were rendered invisible from a distance by being steadily wind driven too far away from vertical. Their colors were just plain invisible until I got really, really, really close. This was a clear (no pun intended) detriment to public safety.

By comparison, the older incandescent lamps were viewable over very wide angles so that their glows would not disappear from sight on windy days.

Still, the LED traffic lights are power efficient, so I guess they must be a great design, unless one considers the issue of single-point failures.

On another day, as I drove westbound on Sunrise Highway in Rockville Centre past the PC Richard store, I saw an entire cluster of LED traffic lights that were turning on and off, on and off, over and over again in a seemingly random fashion.

At that same spot the next day, the entire cluster had gone dark with no operation at all.

Apparently, the entire set of lights had been made to run from a single power supply which on that occasion, had given up its ghost. To be blunt, the situation was nothing less than a catastrophic, single-point failure endangering public safety.

With the old incandescent lamp traffic lights, a single-point failure would simply mean an open filament. In that case, the remaining lamps can continue to function until repairs can be made.

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Meetings

April 2006

7:00 PM, Wednesday, April 5, the first Wednesday of the month.
Great Room, Briarcliffe College, 1055 Stewart Avenue, Bethpage, NY

Topic: "CPR"

Speaker: Mr. Norman Weingart, Syosset, NY.

Admission is free (no charge). No pre-registration is required. For further information, contact the Chairman, John Dunn, by e-mail: ambertec@ieee.org, or by telephone: (516)378-2149.

Norman Weingart is one of the founders of Communications Specialties, a firm that designs and manufactures fiber optic transmission systems for video, audio, and data, as well as audio-visual products such as scan converters, video scalers, distribution amplifiers, etc.

He retired in 2001 and attended a CPR course at Syosset High School where he became familiar with Automatic External Defibrilators (AEDs). Realizing that an AED would benefit his synagogue, he requested a budget to purchase one and train various members in its use. In order to maintain the proficiency of the members, he attended North Shore LIJ's Professional Training Department, where he received training and became certified as an American Heart Association Heartsaver AED instructor.

Mr. Weingart now teaches various CPR and Heartsaver AED courses as a volunteer. The lecture on April 5 will not be a certification course. Certification courses are longer and have restrictions on the teacher/student ratio. The American Heart Association and other organizations that teach CPR have adopted new protocols, which have not yet been officially published. We will get a preview of the new protocols, which should be learned by people who are already certified.

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Chairman's Corner — *continued from page 1*

With those Rockville Centre LED traffic lights, a single-point failure had completely defeated traffic light operation at that intersection and again put public safety in jeopardy.

Still, the LED traffic lights are power efficient, so I guess they must be a great design unless one considers the issue of inclement weather.

In mid-February, we had that blizzard. While driving westbound on Sunrise Highway in Wantagh near an Exxon station, several LED traffic lights had acquired coatings of ice and snow so thick and so heavy as to hide their LEDs from view. At one light, I could just barely make out a slight little twinkle of green and at the next light a moment later, just a slight little twinkle of red. Once again, public safety was compromised over that much-vaunted power efficiency.

Since the LED traffic lights are power efficient, they don't get hot enough to clear away winter ice and snow accumulations. Incandescent traffic lights however, stay visible in the heaviest winter weather simply because they do use more power, their very trait held to be undesirable in the first place.

Still, the LED traffic lights are power efficient, so I guess they must be a great design.

At least I've been told that they are.

Hurricane Suppression — ***Dr. Richard LaRosa, sealevelcontrol.com***

At our March meeting, I described pumping stations powered by ocean thermal energy conversion (OTEC). These were to be stationed on the Atlantic Ocean side of the Windward Islands so that cold water pumped up from 1400 m depth could be mixed with the warm surface currents entering the Caribbean Sea to lower the sea-surface temperature (SST). Great idea, but I overlooked the fact that the lower SST would reduce the heat lost from the sea surface by evaporation and convection. (Long-wave radiation has a negligible effect.). Before introducing the pumps, the solar radiation absorbed by the water was balanced by the surface heat loss. The solar absorption does not depend on the SST, so with the pumps cooling the surface, the solar input exceeds the lowered surface heat loss, and the SST rises along the stream. By the time the water reaches the hurricane-critical Gulf of Mexico (GOM), the old balance has been restored. The SST in the GOM is not affected by the cooling water injected far upstream. Hurricanes are not suppressed, water transported into the Atlantic Ocean is not cooled, Arctic melting is not slowed, nor is sea level rise slowed.

The obvious solution is to put the pumping stations in the GOM at specific places where the SST can be great enough to supply latent heat to a hurricane. Water enters the Gulf in a northward flow from the Yucatan Channel. It should turn eastward to enter the Florida Straits, but much of the time it makes a clockwise loop into the deep part of the Gulf before it exits through the Florida Straits. This current is aptly named the Loop Current. The loop elongates in a northwest direction generally aimed toward New Orleans. The narrow loop pinches together and forms a closed ring which eventually separates from the loop and drifts away. The flow around the ring is clockwise.

The Coriolis force causes surface water to be swept to the right of the current flow in the Northern Hemisphere. This means that water piles up in the center of the ring. Equilibrium is reached when the weight of a water column on the right of the current equals the weight of a water column on the left-hand side of the flow. The taller column on the right must contain the lighter, warmer water. For this reason, the clockwise ring is called a warm-core ring, or eddy. Inside the core the water temperature is constant from the surface down to a depth of about 150 m. The center of the loop is also warm. A hurricane passing over such cores gains an enormous amount of latent heat that energizes it. Hurricane Katrina gained its maximum intensity after it passed over a loop and an almost-detached ring. It thus appears that warm-core rings are good targets for sea-surface cooling.

The ring contains a large, but finite, quantity of warm water. After it separates from the Loop Current it is disconnected from the source of warm water because the Loop Current follows a path around the remainder of the loop. Pumping stations moored within the warm core have access to water at a temperature of 5 °C at a depth of 1000 m. They can slowly reduce the temperature over a period of months without having to cool an influx of new warm water. This

advantage is offset by the uncertainty in determining the most advantageous initial locations for the pumping stations, the variability of the current direction (which might reverse as the ring drifts past the pumping station), and the necessity for mobility to keep placing the pumping stations ahead of the drifting ring. It appears that there are methods of satisfying all these requirements.

In the March meeting, a tension-leg platform was presented as a means of suppressing up-and-down acceleration of the pumping station due to wave motion. Upward acceleration would cause the water in the pipe to boil and vapor-lock the cold-water pumps. Instead of making the pumping station an integral part of the taut-moored submerged platform, many platforms might be anchored in places likely to be visited by warm-core rings. The cold-water pipes can be an integral part of the permanent platform. A twin-pontoon transporter can lower the pumping station onto the platform and cold-water pipe. The perforated fabric hoses can be attached, and the OTEC power plant can be started with electric power from the transporter boat. The pumping station would have rollers and a yaw motor to rotate it around a track on the platform. The best azimuth orientation would be predicted from satellite observations and instructions would be transmitted to the station's yaw control. Based on typical warm-core diameters, it might be expedient to make the transporter long enough to carry two pumping stations so that one crew can pick up two stations and make the 20-hour trip across the ring to install them on platforms ahead of the drifting ring.

Only a few calculations have been made for this latest warm-core cooling strategy. A lot more work must be done, always looking for the fatal flaw that might sink the idea.