THE CONSULTANT

The Newsletter of the IEEE Consultants Network of Long Island

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Chairman's Corner – December 2005

—Murray Kleiner, Chairman

For my final column as your chairman, I thought I would address some topics that I have written about or alluded to in my previous columns. Because the issues are technology related, they either affect us, or we, as engineers, programmers, etc., can affect them… hopefully for the better.

The first issue deals with the abusiveness of technology. I am referring to the telephone. At a time when we are throwing around phrases like "user-friendly", the "geniuses" who are designing these systems have decided to incorporate menus. Let's understand something. Menus have been around for centuries. We use them as a table of contents in books and magazines, we use them in restaurants so we can pick one from Column A and two from Column B, and we use them to select a wine from a wine list. The menu is a highly effective visual tool. Did you ever go to a restaurant and, after being handed the menu, the waiter recites the specials of the day? How many times did you ask him to repeat it, and how many times did you just say "the hell with it" and ordered from the menu? Listening to a menu over the phone is time consuming and frustrating, especially when you have to replay it because you didn't hear your choice. It can be especially stressful when there is some urgency such as when calling your doctor. There has got to be a better way.

The second issue also deals with abusiveness as relates to technical support. With today's technology, companies can easily set up engineering, manufacturing, and support systems in countries where labor is cheap. They may be saving lots of money, but there is a price to be paid for this. I'm going to relate my own experience, but I can tell you that I personally know of others who have had the same results. Also, if you check the online forums, you will find similar complaints.

When I try to record audio on my new notebook, I get a background hum. After spending seven hours over a period of two weeks with the manufacturer's "award winning" support (I won't bore you with the details of how I had to go back and forth between hardware and software support), they decided to replace the motherboard. The technician arrived at my home three days ago and replaced the board. Not only was the problem not fixed, but new problems were created. I had annoying keystroke sounds and the fan was operating continuously at maximum speed. Usually, you can fix this in the bios, but not in my computer. I had no choice but to contact tech support.

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Meetings

December 2005

7:00 PM, Wednesday, December 7, the first Wednesday of the month.

Briarcliffe College, 1055 Stewart Avenue, Bethpage, NY.

Topic: "Protecting Your Assets When a Client Files Bankruptcy"

Speaker: Alan C. Stein, Esq.
Gastwirth, Mirsky & Stein, LLP, Manhasset, NY.

Admission is free (no charge). No pre-registration is required. For information, contact John Dunn at (516) 378-2149 or e-mail ambertec@ieee.org. Guests are welcome.

Directions:
LIE Exit 44, South 2.77 mi on Route 135 to Exit 9, Right on Broadway 0.12 mi, Right on Cherry Avenue 0.42 mi, Right on Stewart Avenue 0.45 mi, Left at the fire house and traffic light (Pine Avenue) and you're in front of Briarcliffe College. Turn right into the second parking lot.

If coming from Southern State Parkway on Route 135, Take Exit 9 and turn Left onto Broadway. Follow the remainder of the above directions.

At the December meeting we will elect officers for 2006. Candidates nominated at the November meeting:

Chairman - John Dunn
First Vice Chairman - Jerry Brown
Second Vice Chairman - Sam Sadinsky, Chris Early
Treasurer - Dave Rost
Recording Secretary - Dick LaRosa

Additional nominations were to be forwarded to Stu Senator or Peter Buitenkant.

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Chairman's Corner --- continued from page 1

Before I go any further, I should tell you that I actually fixed the problem myself. While waiting for tech support to pick up the phone, I posted the problem on a forum. A few hours later, while I was still on the phone, I received a reply with a recommendation from someone who had experienced the same problem. I tried his suggestion the next morning and corrected the problem within a few minutes. In the meantime, I spent six hours with tech support that night. By 11:10 pm, the tech gave up. He said he would work on the problem and call me back the next evening. He didn't call (didn't matter since I already fixed the computer), but he emailed me the following morning saying that they were still working on the problem. This morning he sent me another email saying that they want to replace the motherboard again. This time I replied telling him to go to the forum where he can find my posting. I also told him what I thought of his company's support system.

Clearly, these companies are providing poor training to their technicians. But there is another question to be asked. How can companies allow their technicians to be tied up with one customer for several hours? Not too long ago, if an issue could not be resolved within a reasonable amount of time, the manufacturer would recommend returning the product for repair or replacement. The answer is that when the technician is being paid a miniscule salary, the company can afford to have him remain on the phone indefinitely. The customer, however, cannot afford to lose so much time. That's how we lose.

This leads me to the third and final issue concerning outsourcing. In previous articles I expressed concern for our own and for our children's futures. In the past, and still today, we allow companies to define who and what we are. When they hire us, they give us a label such as engineer, programmer, physicist, etc., even if we didn't major in those subjects and even if we didn't graduate from college. As the years go by and we look to change jobs, these same companies judge us by the work we did at our previous place of employment. They are closed-minded to new skills and training that we may have acquired on our own.

I believe that the solution begins by changing how we think and act. Individuals should think of themselves as entrepreneurs or consultants, and they should learn how to market themselves in order to remain gainfully employed. As consultants, we are free to redefine ourselves as often as we choose, providing we can deliver the products and services that we promise. We can change our skill sets and, when appropriate, join forces with other consultants who can complement our skills when bidding on jobs that require additional expertise. We can do all of this without undergoing a career change with the accompanying cut in salary.

One of the drawbacks, however, is that we are always looking for work – a very distasteful thought to most of us. Another deterrent is the insurance and pension structure that binds us to our employers and limits our freedom to explore other opportunities. Also, our colleges and universities seem to be slow in responding to current trends. The days of sending out one hundred resumes and expecting to get a job are long gone. Today, each individual must know how to aggressively market him or herself to survive in a society where there is less room for mediocrity, and where only the strongest will survive.

I believe that colleges have a responsibility to prepare their students for a different kind of life, and we, our consultants' network, can help. We can offer to speak in classes and invite students to our meetings where we can share our own experiences and thoughts on how to function within a global economy.

Hydrocarbon Fuels ----- Carl E. Schwab

INTRODUCTION

For many years much has been written about the hydrogen age. The great benefit of using hydrogen as a fuel is that the combustion product is water. Water vapor is a greenhouse gas, but unlike carbon dioxide, it can be removed from the atmosphere as precipitation. It can also be condensed and used as a fresh water supply. Unfortunately, hydrogen is always found in nature combined with oxygen, carbon, or a mixture of these and other elements. When combined with oxygen in the form of water, it takes a lot of energy to pry the hydrogen loose. When combined with carbon, it is already a fuel that has some good properties. Nature provides an almost inexhaustible energy source via methane and natural gas.

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SATURATED HYDROCARBON SERIES

Methane (CH_4) is the first member of the saturated hydrocarbon series, also called the paraffin series. Members of this series have the chemical formula C_nH_{2n+2}. Natural gas (NG) is a mixture of methane, ethane (C_2H_6), propane (C_3H_8), and butane (C_4H_{10}). Methane accounts for 90% or more of this mixture. Propane and butane are removed, processed, and sold separately. The n = 2,3,4 members are called LP or low pressure and require various levels of pressurization to remain liquid at room temperatures.

Methane is lighter than air and the LP gasses are heavier than air. This is important in terms of safety. Many people have an inherent fear of 'gas' because of explosions in buildings. In most cases this has resulted from a leak into the basement area of a building and ignition either by electrical spark or pilot flame from a furnace. In a great many of these cases the gas was LP, which is heavier than air, and by gravity just stays in the basement until blown out by fan or, worse luck, by explosion. On recreational vehicles, if cooking and/or heating are by LP gas, the tanks are stored outside the enclosed area. If compressed natural gas (CNG) is used then only a small vent hole in the ceiling area (highest point) is required and the CNG can be safely stored inside. In the Mid-west where CNG is favored, installation of leak detectors and small maximum height vents are standard practices.

The higher members of the saturated hydrocarbon series are gasoline (n = 5,6,7,8), naptha (n = 9,10,11), kerosene (n = 12 – 16), diesel fuels (n = 10 – 19), and heavy oil (n = 17 – 35). As n gets larger, combustion uses two hydrogen atoms for every carbon atom. Methane combustion uses four hydrogen atoms for every carbon. Therefore, methane is considered to be a cleaner fuel, producing less CO_2 and less global warming.

The higher members of the series are mostly refined from crude oil that comes from wells. They can also be made from methane. In the 1930s the German scientists had developed a good understanding of how catalysts, combined with proper pressure and temperature, could be used to convert CH_4 into higher-order hydrocarbons. The problem in WWII for the Germans was they did not have a lot of CH_4 but did have a lot of coal. So this science was harnessed to produce gasoline and diesel fuels from coal. At the present time, in the tiny country of Qatar, which has enormous amounts of CH_4, two large facilities are currently under construction with the object of manufacturing a super-clean diesel fuel from CH_4 using the same processes developed by the Germans in the 1930s.

SOURCES OF METHANE

The preponderance of living organisms on this earth are carbon based, and when they die they decompose into mostly CH_4 and CO_2 i.e. methane and carbon dioxide. When you consider that plankton is one of the earliest living organisms, then it is reasonable that huge amounts of CH_4 and CO_2 are present in the oceans of the world. And their continued production is assured as long as the Sun shines. The amount of CH_4 and CO_2 in the oceans is about 2000 times the amounts that are under the continental land masses and in the whole atmosphere. Much of both CH_4 and CO_2 in the ocean is stored in clathrate form. Clathrating is really nothing but hydrating under the proper pressure and temperature combinations. In clathrates, each 5.75 molecules of water will store or sequester one molecule of CH_4 or CO_2.

Clathration is a useful technique for mining or recovery of methane on land. In the Midwest there are large coal deposits that are thin (perhaps 30 feet thick) and some several hundreds of feet below the Earth's surface. The existence of these coal layers was evidenced when test drilling for oil. Old logs from test drillings often noted large amounts of water and evidence of NG. Only if the NG was sufficient, then maybe the well would be 'brought-in' as a gas well. In most cases the well was closed off because a single gas well wasn't economically viable.

What was not recognized in many cases was that much more NG was hydrated in the water. Also not recognized was that if the water were pumped to the surface, processed and pumped back down more NG would be drawn from the coal layer. What is now known is that multiple well points into the coal layer area can be used to inject water from the surface to hydrate the NG in the coal layer and then pump it back to the surface. A typical area for this process would be a section, or one square mile. Four well points would be located at the corners and a fifth located at the center. The geometry doesn't need to be exact and where the area is large(several square miles) nesting geometries are used. The direction of pump flow can be periodically reversed to improve NG recovery. This is a continuous process and nowadays is referred to as hydraulic mining of NG. If the NG recovery rate slows too much, then the pumping can be stopped while the hydrating continues as the CH_4 molecules percolate through the water. In the jargon of oil pumping this is called 'resting the wells'. Some estimates are that such gas recovery systems can produce for up to 30 years or more. The process of coal-layer re-generation of NG is only now being seriously studied.

Methane has also been recovered from decaying matter in landfills and from animal excrement. This is done with the aid of bacteria. Electrical power is being produced from chicken, pig, and other manure on animal farms. These plants are part of the distributed electrical generation system in the US and other countries. Thawing tundra is expected to release much methane into the atmosphere, where it will act as a greenhouse gas. There seems to be no way at the present time to capture this methane and use it as a fuel.

ENERGY TRANSMISSION

Electrical power can be sent from one location to another via a wire transmission line. The power multiplied by the time duration of the transmission is the energy transfer from the sending to the receiving end of the transmission line. Similarly, a volume of liquid or gaseous fuel represents the potential to do a certain amount of work or provide a certain amount of heat if combusted. The heat energy released when combusted is measured in British Thermal Units (BTUs), so the quantity of fuel transmitted can be measured in BTU equivalents. Electrical power can be converted to heat and the electrical energy transmitted can be measured in BTU equivalents.

Electrical transmission lines have losses and fuel pipelines require pumping power to overcome friction. These losses and other energy expenditures required to transport the fuel or electric energy can be measured in BTU equivalents and the efficiency of transmission compared. Using this concept, the efficiency of transmitting energy by coal carried in railroad cars, or fuel carried in tanker trucks, or oil or coal carried by barges can be compared with electrical power transmission or fuel pipelines. The losses of all these energy transmission systems are proportional to the transmission distance.

For energy transmitted from the US west coast to the east coast, a natural gas pipeline has an efficiency of 97%, while electric power, coal, and heavy oil transmission efficiency is 75 – 85%.

STORAGE OF METHANE

Methane gas can be stored under pressure in tanks. It can be cooled and liquefied to store more molecules per unit volume. Liquefied natural gas (LNG) tank ships are being used to transport methane from oversea sources. Gas from wells is liquefied and stored in cryogenic tanks on board the ships and brought to the consumer country, where it is gasified and distributed via pipeline.

Underground abandoned salt mines are currently used to store CH_4. Typically, the ground surrounding the abandoned mine is literally air-tight and CH_4 can be stored therein with pressurization. This practice has been and is used in the Midwest and Northeast.

CONCLUSION

Until the advocates of the hydrogen economy devise an economically and environmentally sound method of producing hydrogen, the world can improve its use of the many sources of methane. This will leave less methane to be released into the atmosphere as a greenhouse gas. Combustion of methane releases less carbon dioxide than other fuels (except hydrogen), minimizing greenhouse gas production.