

**The Florida West Coast
Section of the IEEE**

Serving over 2,300 members in Charlotte,
Citrus, DeSoto, Hardee, Hernando,
Hillsborough, Lee, Manatee, Pasco, Pinellas,
Polk, and Sarasota Counties



THE

SUNCOAST

SIGNAL

THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

Volume 51 — No. 3

<http://www.ieee.org/fwcs>

March 2008



*Inside this
Signal...*

Page 2

- * *Editors Column*
- * *LightningMaster*
- * *I&CPS Conference*

Page 3

- * *State Science and Engineering Fair*
- * *Siliconexion*

- * *Training on NFPA 70E-2004*

Page 4

- * *Celebrate Engineering Banquet Story*
- * *OES Distinguished Technical Achievement Request for Nominations*

Page 5

- * *Distribution and Power Transformer Seminar*

Page 6

- * *Automotive EMC Test and Design Conference*

- * *Lignell Award Winners*

Page 7

- * *Signal Processing Meetings*

Page 8

- * *Calendar*



This Month's Meetings



*Signal Processing and Communications Society Joint Meeting
Effects of Connector Endface Geometry on High Speed Optical
Systems*

Wednesday 05 March 2008

**Speaker: Anthony W. Medeiros - MF Lightwave, Inc.
Tampa, Florida USA**

Time: 6:00 pm [For more, see page 7]



Distribution and Power Transformer Seminar

Friday, March 28

Registration: 8:30AM – 9:00AM

Seminar 9:00AM – 3:30PM

Speaker: Don Duckett, HD (IEEE Senior Member)

Location: Seminole Electric, 16313 North Dale Mabry Hwy, Tampa, FL 33618

[For more, see page 5]

2006 IEEE EXECUTIVE COMMITTEE FLORIDA WEST COAST SECTION

CHAIR: Jim Anderson 813-425-2467
jim.anderson@ieee.org

VICE CHAIR: Serge Beauzile, Progress Energy,
727-344-4123 or 727-409-1242 sbeauzil@yahoo.com

SECRETARY: Serge Beauzile, Progress Energy,
727-344-4123 or 727-409-1242 sbeauzil@yahoo.com

TREASURER: Ralph Painter,
Tampa Electric Co. (813) 228-4685 rdpainter@ieee.org

SIGNAL EDITOR: Richard A. Sanchez,
Phone (813)239-3849 richard.sanchez@ieee.org

AWARDS & BYLAWS : Richard Beatie, PE, Lightning Master
(727) 580-3598 r.beatie@ieee.org

EDUCATION: Dr. Rudolf E. Henning and Zhen Tong
(813) 974-4782 or (727) 328-8777 (Ext: 333)
henning@eng.usf.edu or tong@ieee.org

MEMBERSHIP: Tom Blair, TECO Energy,
813-228-4407 tom_blair@ieee.org

TEACHER IN-SERVICE: Sean Denny, Venner20@aol.com

PES/IAS CHAPTER: Tom Blair, TECO Energy,
813-228-4407 tom_blair@ieee.org

MTT/AP/ED CHAPTER: Ken A. O' Connor
kenoconnor@ieee.org

COMP/AESS CHAPTER: James S. Lumia (813) 832-3501,
jlumia@ieee.org

EMBS: Engineering in Medicine & Biology: Dr. Ravi Sankar:
813-974-4769 sankar@eng.usf.edu

SP/COMM CHAPTER: Hüseyin Arslan USF (813) 974-3940,
arslan@eng.usf.edu

WIE: Women in Engineering: Suzette Presas (813) 974-4851
spresas@mail.usf.edu

LIFE MEMBER AFFINITY GROUP: TBD

GOLD: Tim Doolittle, tdoolittle@tmdvault.fastmail.fm

PACE: Scott Haynes, Honeywell (727)-539-3358,
scott.haynes@ieee.org

James S. Lumia (813) 832-3501, jlumia@ieee.org
Richard Sanchez

STUDENT BRANCH CO-ADVISORS:

Dr. Paul Schnitzler, USF PS&A (813)-974-5584
pauls@eng.usf.edu

Dr. Chris Ferekides, USF, (813) 974-4818
ferekide@eng.usf.edu

Dr. Srinivas Katkooori, USF, (813)-974-5737
katkooori@ieee.org

STUDENT BRANCH MENTOR: Jim Howard, Lakeland Electric
(863) 834-6506 j.howard@ieee.org (H) (813) 876-1748

STUDENT BRANCHES:

Manuel Bravo IEEE, mbravo@mail.usf.edu

Upavan Gupta, IEEECS (813)-974-1348, ugupta@csee.usf.edu

CONFERENCES: Jim Beall, j.beall@ieee.org

WEB PAGE: <http://www.ieee.org/fwcs>

WEB MASTER: Michelle Chang, michelle.chang@ieee.org

THE SUNCOAST SIGNAL is published monthly by the Florida West Coast Section (FWCS) of the Institute of Electrical and Electronics Engineers, Inc. (IEEE). THE SUNCOAST SIGNAL is sent each month to members of the IEEE on Florida's West Coast. Annual subscription is included in the IEEE membership dues.

The opinions expressed, as well as the technical accuracy of authors, advertisers or speakers published in this newsletter are those of the individual authors, advertisers, and speakers. Therefore, no endorsement by the IEEE, its officers, or its members is made or implied.

All material for THE SUNCOAST SIGNAL is due in electronic form by 1st

Friday after the 1st Tuesday of the month preceding the issue month.

Address all correspondence to:

Richard A. Sanchez
1018 Berry Avenue

Tampa, FL 33603

Home Phone 813-239-3849

E-MAIL: rsanz@verizon.net

The Signal, Copyright 2008

Coming Aboard (Editor's Column)

The March issue of the Signal will be my first and it will be with input and coaching from Paul Schnitzler. I have learned a few things since spending time with Paul and learning the "Process" of how the Signal gets created each month. All I can say is that I didn't appreciate the magnitude of the job. The newsletter appeared each month and it looked good with interesting articles. The task of collecting the content (and reminding some to send it), deciding which ones make the cut, making sure there are no errors and how they are arranged in the pages were things that never crossed my mind. The next time you see Paul, tell him thanks for a job well done! He has set the bar high with his standards for content, appearance and accuracy. I will try to continue meeting that standard. I'm sure I'll slip a few times, so be patient!

Richard Sanchez

LightningMaster
Corporation 

Richard E. Beatie, P.E.
Director Of Engineering
Structural - Bonding/Grounding - Surge

1351 N. Arcturus Ave. (800) 749-6800 Voice
Clearwater, FL 33765 (727) 580-3598 Cell
(727) 499-0138 Fax

www.LightningMaster.com RBeatie@LightningMaster.com

[Web Site](#) [Email Me](#) [Map to Us](#)

Advance notice of a May 2008 Conference!



The Industrial & Commercial Power Systems Technical Conference

Returns to the Tampa Bay area May 4 – 8, 2008. It is again being held at the Sheraton Sand Key on Clearwater Beach. See the web page at:
www.ieee.org/icps2008.

For more information, contact James Beall, Chair - email j.beall@ieee.org



State Science and Engineering Fair

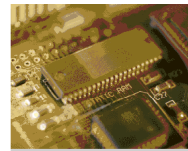
The 53rd State Science and Engineering Fair of Florida will be held at the Lakeland Center in Lakeland, Florida April 16th – 18th, 2008.

We invite you to share your professional expertise as a Judge for the State Science and Engineering Fair (SSEF) of Florida on Thursday, April 17th, 2008 at the Lakeland Center. In order to facilitate the Judging process efficiently, we need more than 400 Judges who have exemplary credentials in their area of science research.

The evaluation and recognition of student research are the most important aspects of the SSEF, and we welcome your willingness to serve. Approximately 900 outstanding student science research projects will be entered in one of two Sections of the SSEF: Senior (9-12 grades) and Junior (6-8 grades). Students will compete for Place Awards, Special Awards, Scholarship Awards, Opportunity Awards, and Grand Awards. Each project will be placed into one of 14 Categories established in each Section:

REGISTER for JUDGING

by going to our website www.floridassef.net to register online. You will receive a confirmation for Judging and several updates as the time nears for Judging. Please mark your calendar.



Siliconexion, Inc.

FPGA Design and Verification Experts

Siliconexion offers robust, on-time electronic design consulting services by experienced senior level professionals.

Applications Include:

Telecommunications / Data Communications
Aerospace and Military
Embedded Computer Systems

Services Include:

FPGA / CPLD Design and Verification
ASIC to FPGA Conversions
Training for FPGA Design, VHDL, Test Benches
Digital and Analog Board-level Hardware Design
Embedded Systems Software Development
High Speed Signal Integrity Analysis

*Cost Effective sub-system or
turnkey product development*

Phone: 727 596-1990

E-mail: info@siliconexion.com

www.siliconexion.com

Training on NFPA 70E-2004 Electrical Safety in the Workplace

- Date:** Friday April 4, 2008
- Time:** Registration & Breakfast: 7:15AM-8:00AM
Seminar: 8:00AM – 4:00PM
- Speaker:** John Leedy, P.E., President, LEEDY ELECTRIC CORP.
Member, IEEE
- Location:** Lakeland Center, Room: Hollingsworth A
701 West Lime Street, Lakeland, FL 33815
http://www.thelakelandcenter.com/h_aboutus/directions.asp
- Cost:** \$250 Members, \$300 Non-Members (Non-Members interested will receive a membership in IEEE) , \$100 Students. Includes Breakfast, Lunch, & Seminar text, “NFPA 70E – Standard for Electrical Safety in the Workplace” (a \$50 value)
- PDH Credits:** Eight (8) professional development hours will be awarded. Be sure to enter your name and PE number on the signup website as it appears on your license. Florida exempt provider #0003849.
- RSVP:** Online at <http://time2meet.com/fwcs-pes3/index.html>
Make checks payable to: Leedy Electric
Leedy Electric Corp.
520 Prairie Industrial PKWY
Mulberry, FL 33860
Space limited to the first 50 registrants!
- Questions:** John Leedy at 863-425-2698 or by email at jpleedy@leedyelectric.com
Tom Blair at 813-228-1111, ext 34407 or thblair@tecoenergy.com

Celebrate Engineering Banquet a Success!

The 8th annual Celebrate Engineering banquet was held on Friday, February 15th. This year's event was held at the A La Carte event pavilion in Tampa. In attendance were over 200 engineers from five local professional engineering organizations that included: the IEEE, ASME, AFE, ASHRAE, and SNAME. This was the first time in four years that the banquet had been held at the A La Carte location and all that participated commented on how nice the location was. A change from recent years past was that a professional MC was used to keep things moving along. Dick Crippen from the Tampa Bay Rays sports team provided his services for this role.

The keynote speaker this year was the Tampa Port Authority's Director and CEO, Mr. Richard Wainio. Mr. Wainio did an excellent job of presenting "the state of the port". During his speech he pointed out that the Port of Tampa remains the largest, most diverse and financially sound of Florida's 12 active seaports and compares favorably with the best and largest ports in this country. Additionally, Mr. Wainio stated that the Port of Tampa:

- Is by far the largest port in Florida in tonnage terms – consistently averaging nearly 50 million tons over the last quarter of a century!
- 14th largest of the nation's ports and there are some 400 ports in this country.
- Largest economic engine in central and west Florida – generating over \$8.0 billion in economic benefits and contributing to the creation of nearly 100,000 jobs throughout the region, including 16,000 at the port.

This year's banquet also saw the awarding of Lignell awards to local high school teachers for excellence in the teaching of math and science. The Lignell award winners this year were

- Mr. Eric Shelton, Sickles High School, Hillsborough County
- Mr. Luigi Galati, Hudson High School, Pasco County
- Mrs. Andrea Carvill, Lakewood High School, Pinellas County

Finally, the IEEE's very own Mr. Tom Blair won this year's IEEE "Engineer of the Year" award. Congratulations Tom!



Oceanic Engineering Society Distinguished Technical Achievement Award for 2008


The IEEE Oceanic Engineering Society is seeking nominations from the Oceanic Engineering Society membership for the Oceanic Engineering Society Distinguished Technical Achievement Award for 2008. The Distinguished Technical Achievement Award is presented to a member of the profession whose technical achievements in oceanic engineering are recognized by their peers. Nominations will be accepted through 14 March 2008.

Please submit nominations to the undersigned.

Thomas Freud Wiener, Sc.D., LSMIEEE
Chair, IEEE/OES Awards Committee
2403 Lisbon Lane
Alexandria VA 22306 USA

t.wiener@ieee.org

For information on other OES activities, go to
<http://www.oceanicengineering.org>



NOLAN POWER GROUP
Power Quality Specialists
Sales – Service

Batteries / Chargers / UPS
PM Service / Capacity Testing
Emergency Call Out

john.todora@nolanpower.com
Phone: 954-333-3040

Authorized EnerSys Representative





***Distribution and Power Transformer Seminar
(including the new D.O.E. Standards)***

- Date:** Friday, March 28, 2008
Time: Registration: 8:30AM – 9:00AM, Seminar 9:00AM – 3:00PM
Speaker: Don Duckett, HD (IEEE Senior Member)
Location: Seminole Electric, 16313 North Dale Mabry Hwy, Tampa, FL 33618
Cost: \$75 Members, \$150 Non-Members, \$25 IEEE Student Members. (Includes Lunch)
PDH Credits: 4 professional development hours will be awarded. Be sure to enter you name and PE number on the sign up website as it appears on your license. Florida exempt provider #0003849.
RSVP: Online at: <http://www.ewh.ieee.org/r3/floridawc/> (Select Reservations)
 Make checks payable to: IEEE FWCS
 Send checks to: Ralph Painter, IEEE FWCS Treasurer
 648 Timber Pond Drive
 Brandon, FL 33510-2937
 Space limited to the first 50 registrants!!!
Questions: Jim Howard at 863-834-8865 or jim.howard@lakelandelectric.com

Back by popular demand is our Expanded Transformer seminar. This seminar will address the key portions of the new DOE 2007 Rule and its impacts on the size, weight, losses, and other criteria for distribution transformers. In addition we will be discussing the basics of transformers and reviewing the sizing methods used in industry. At the end of each section, an in-class assignment will be given and reviewed. Below is the general outline for the class:

- 09:00 – 10:30 **Transformer Overview**
- 10:30 – 10:45 **Break**
- 10:45 – 12:00 **Transformer Overview (continued)**
- 12:45 – 02:00 **Insulation Life (C57.91) + Case Studies**
- Power Models (TAP Program) Simulations**
- 02:00 – 02:15 **Break**
- 02:15 – 03:30 **Power Transformers Maintenance/DGA (C57.104)**
- Wrap Up (Certificates, etc.)**

Note: The DOE has put in place new efficiency requirements for liquid filled transformers. The new requirements go into effect on January 1st, 2010 and most current transformer designs will have to be replaced. The sizes and weights for the newly designed transformers will be larger and heavier than the current transformer being purchased. Don will cover the changes and possible effects it might have on the industry and on you, the Customers.



Lignell Award Recipients 2007-2008

Pasco County:

Luigi Galati lgalati@pasco.k12.fl.us from Hudson High School received his degrees from the University of Florida. He has a Bachelors degree in Physics and a Masters in Science Education. He has taught as an inner city school teacher in New York for one year. He has also taught Physics for 1 year and Math for 2 years in Pasco County. Currently he is teaching Physics Honors, Algebra I and Geometry. Mr. Galati is an outstanding math and science teacher whose innovation and passion is instilled in the learning of his students. He is committed to bringing real-world applications into the classroom. "The Great Siege Machine" is an innovative project that he uses to teach his Physics students about engineering. The trebuchet competition has motivated his students to utilize knowledge from Math, Science, and Social Studies.

Hillsborough County:

After receiving his Bachelors of Science in physics at Arizona State University, Eric Shelton Eric.Shelton@sdhc.k12.fl.us went back and earned his Masters in Education. He began teaching high school and college shortly thereafter. At the high school level Eric taught honors and dual enrollment physics while teaching calculus based physics for engineers at Mesa Community College. Combined with his time in Florida, Eric has been teaching high school students for twelve years.

During that time he created a high school aerospace program that worked closely with three local colleges to prepare students to enter aerospace engineering and similar fields. At the same time Eric was working with that district to implement several hands on teaching programs at the middle and elementary school level in order to give students a leg up when they entered high school.

After moving to Florida, he began teaching honors and AP physics at Sickles High School. Further, he was successfully awarded National Board Certification for teaching and has been a master teacher for numerous student teachers during my tenure. Eric currently takes students to elementary schools to build water rockets with the younger children to build a love for science. On the high school level, his students engage in engineering projects each year in friendly competition with each other. These project include stationary towers (lightest tower to hold five pounds successfully), mousetrap cars testing braking systems, spaghetti and balsa wood bridges and Rube Goldberg tasks.

Pinellas County

Andrea Carvill CARVILLA@pcsb.org is a remarkable veteran educator whose engineering background, enthusiasm for teaching and commitment to providing her students with challenging and engaging learning opportunities in applied mathematics and science sets her apart as an outstanding teacher. She started her career as an educator by applying her 5 years experience as a chemical engineer with Procter & Gamble in creating inquiry-based learning projects for her students.

In 1995, this mother of two boys implemented an integrated math curriculum while teaching math at the 21st Century Learning Center at Largo High School. Following her tenure at Largo High, Andrea became very involved in providing the children in the Youth Engineering Society-SECME Program workshops on building mousetrap cars, technical papers, technical drawings, simple electronics, solarbotics and LEGO robotics. She was the first coach for the "Power House Rangers" an all-girl LEGO league team sponsored by the Society of Women Engineers. This team went all the way to the FIRST LEGO National Robotics Championship in 2001.

After attending a workshop on BEAM robotics at Los Alamos National Laboratory, Andrea returned to help create and implement BEAM Solarbotics, which encourages the recycling of discarded simple electronics to create new entities, in the YES-SECME Program and at Lakewood High School's Program for Environmental Technology and the Center for Advanced Technologies (CAT). Recently, she has received grants to implement the study of hydrogen fuel cell cars in her Chemistry and AP Statistics classes at the CAT Program. In 2006 and 2007, her students presented research at the Youth Energy Summit held at UCF in Orlando. In 2007, several of her students successfully competed at the Florida Solar Energy Center and advanced to compete at the 2007 International Youth Fuel Cell Competition this past October.

This past December, Andrea was the cosponsor of the Tropical Wave FIRST LEGO League Robotics competition held at Lakewood High. And after all of this, she still has time to go hiking, bike riding, skiing and scrap booking with her family and friends. Andrea is truly an inspiration to her students.



Signal Processing and Communications Society Joint Meeting Effects of Connector Endface Geometry on High Speed Optical Systems

Speaker: Anthony W. Medeiros - MF Lightwave, Inc.

Tampa, Florida USA

Date: Wednesday 05 March 2008

Time: 6:00 pm

Location: University of South Florida, Building ENB, Room 109

4202 E. Fowler Ave., Tampa, FL 33620.

ABSTRACT: The deployment of fiber optic networks has opened the window for the consumer to enjoy services and capabilities that have revolutionized the way we communicate. The optical network operating at the speed of light has opened up the world to almost instantaneous messaging and up to date news, keeping everyone informed of our constantly changing environment.

- In this session we will address the deployment of “Fiber to the Home” services, features and associated problems with an *All Optical Network*.
- Explanation of Passive Optical Systems (PON) and their various architectures GPON, BPON and EPON
- The effects of fiber optic connector endface geometry on high speed systems
- The effects of reflection on Gigabit modulated lasers
- How to overcome these effects with precision fiber polishing techniques
- Sub Micron Measurement techniques on the fiber optic connector endface
- Next generation optical systems beyond 40 Gb/sec

A Branch and Bound Approach to Multi-user Detection in Asynchronous CDMA

Speaker: Patrick H. Stanley, P.E. – LTC Engineering Associates

Sarasota, Florida USA

Date: Wednesday 16 April 2008

Time: 6:00 pm

Location: University of South Florida, Building ENB, Room 109

4202 E. Fowler Ave., Tampa, FL 33620

ABSTRACT: Multi-user detection (MUD) is a technique that can be used at code-division multiple-access (CDMA) cellular base stations to improve performance in systems with a large number of users. A literature search found prior published work that has shown the relative speed and accuracy of the Branch and Bound (BBD) based fast optimal algorithm method for MUD. In this prior work, BBD was compared with several methods in synchronous CDMA transmissions over AWGN channels, and was found to lie on the “efficient frontier,” which is a convex hull of algorithms plotted on the probability of error versus computational demands axes. This work extends the BBD method for MUD in synchronous CDMA channels to asynchronous CDMA, where a noise whitening filter is employed at the output of a matched filter. This work set out to test whether the relative performance compared to other techniques found on the “efficient frontier,” including decision-feedback (DF) detection, probabilistic data association (PDA), and sphere detection (SD), holds for asynchronous channels.

For driving directions, contact [Hector A. Martinez](#) or click [here](#)



NASA To Test Lunar Habitat in Antarctica

NASA will use the cold, harsh, isolated landscape of Antarctica to test one of its concepts for astronaut housing on the moon. The agency is sending a prototype inflatable habitat to Antarctica to see how it stands up during a year of use.

Agency officials viewed the habitat in mid-November at ILC Dover in Frederica, Del., as it was inflated one last time before being packed and shipped to Antarctica's McMurdo Station. NASA is partnering on the project with the National Science Foundation, Arlington, Va., which manages McMurdo Station, and ILC Dover, the company that manufactured the prototype structure. All three organizations will share data from the 13-month test, which runs from January 2008 to February 2009. An inflatable habitat is one of several concepts being considered for astronaut housing on the moon.

NASA's Constellation Program is working to send humans back to the moon by 2020. After initial sorties, the astronauts will set up a lunar outpost for long-duration stays, and they will need a place to live. The agency is developing concepts for habitation modules that provide protection for the astronauts and are easy to transport to the lunar surface.

"To land one pound of supplies on the lunar surface, it'll require us to launch 125 pounds of hardware and fuel to get it there," Lockhart said. "So our habitation concepts have to be lightweight as well as durable. This prototype inflatable habitat can be taken down and redeployed multiple times, and it only takes four crew members a few hours to set up, permitting exploration beyond the initial landing area."

The structure looks something like an inflatable backyard bounce house for children, but it is far more sophisticated. It is insulated and heated, has power and is pressurized. It offers 384 square feet of living space and has, at its highest point, an 8-foot ceiling. During the test period, sensors will allow engineers to monitor the habitat's performance.

The National Science Foundation also is interested in lighter, easier-to-assemble habitats. It currently uses a 50-year-old design known as a Jamesway hut, which is bulky and complex in comparison to the habitat being tested. Modern variations on the Jamesway, although lighter, are still rigid and difficult to ship, with limited insulation. During the test of the new inflatable habitat, NSF will study improvements in packing, transportation and set up, as well as power consumption and damage tolerance for this newest variation of the concept.



Energy Bill an Important Step Toward Energy Independence

On 19 December 2007, President Bush signed into law the *Energy Independence and Security Act* (H.R.6). The bill passed with overwhelming support in both the House of Representatives (314-100) and the Senate (86-8). The most significant component of the comprehensive legislation is a provision to require the auto manufacturers to boost fuel economy standards for cars, light trucks and sports utility vehicles to an average of 35 miles per gallon by the year 2020. The bill also mandates a roughly five-fold increase in ethanol production to 36 billion gallons a year by 2022.

Left out of the final bill, however, were provisions contained in earlier versions to require investor owned utilities to produce 11 to 15 percent of their power from renewable sources by 2020, and a \$22 billion energy tax incentive package for renewable energy, efficiency measures and other technologies. The tax incentives were contained in earlier versions of the bill, but were dropped due to opposition from the Bush Administration and others in Congress because they were to have been paid for by raising taxes on oil companies. Congress failed to reach consensus on these sections of the bill and they were eventually abandoned to help smooth the way for passage of the final legislation.

The energy bill also contained two provisions that are of particular interest to IEEE members. The first is language that authorizes \$95 million to develop a competitive grants program to encourage the use of plug-in electric drive vehicles or other emerging electric vehicle technologies. The grants will be provided on a cost-shared basis to state and local governments, metropolitan transportation authorities, or even private or non-profit entities. Also included in this section are provisions to develop a nationwide electric drive transportation technology education program, which will include an electric vehicle competition and financial assistance to colleges to create new or support existing degree programs to ensure the availability of trained electrical and mechanical engineers to work on plug-in electric or other forms of electric drive transportation vehicles.

IEEE-USA's advocacy effort on Capitol Hill for PHEVs was concerned that the legislation came up short in promoting plug-in hybrid technology. "Many in the technology community feel strongly that plug-in hybrid vehicles can play a significant role in promoting U.S. energy independence, mitigating global climate change and enhancing our national security," said Tom Gentile, chair of IEEE-USA's Energy Policy Committee.



Brain Teaser Challenge Solution - January 2008

Butch Shadwell

Zorg was "...trying to lift his prototype contraption into the test stand to measure the output. It weighs 2000 pounds but Zorg is only able to pull with 100 pounds of force. If he uses a block and tackle system (multi-wheeled pulleys) and he pulls on the rope end coming down from the upper block, what is the minimum number of wheels each block needs (upper and lower) in order for him to be able to lift his device into position? The other end of the rope is fastened to the bottom of the upper block. Also, assume zero friction from the pulleys. This could be a little tricky for some. What happens if we terminate the far end of the rope on the lower block instead of the upper one?"

I thought this would be one of the easier BTCs. After all, a mechanical advantage problem with pulleys? As I write this, no one has sent me the correct answer. As I mentioned it is a little tricky. The most common answer was to calculate a tension in the supporting strands of 100 pounds with the load supported. This required 20 supporting strands and ten sheaves on each of the top and bottom blocks. The error with this answer is that with this block and tackle system Zorg would be able to hold his engine and keep it from falling, but he could not pull with enough force to actually raise it high enough to get onto the test stand. To add potential energy to the system (i.e. raise the weight), he must exert more than the static force. So the correct answer has to be 11 sheaves on the top and the bottom blocks. If the far end of the rope is attached at the lower block, then it works with 11 sheaves on top and 10 sheaves on the bottom. But I bet you already knew that.



Brain Teaser Challenge – February 2008

Today I judged the regional science and engineering fair in Jacksonville, Florida. I'm not quite sure how I got the job, but I have been the head judge for several years now. It is a lot of work, but the kids are great. I recommend you try it if you get the chance.

One of the great things about young folks is that they have not learned yet what is supposed to be impossible. What's good about this is that they don't rule anything out. When they are brainstorming, there are no stupid ideas and almost everything is worth trying. Every once in a while one of the crazy ideas actually works.

At the fair this year I judged a project involving the ubiquitous fruit fly. I guess I should not use the singular form of the noun since this kid had been breeding fruit flies for the last four years and feeding them like crazy. The object was to see how many fruit flies it takes to screw in a light bulb. The feat was accomplished by taping a tongue depressor to a light bulb forming a lever arm, and training the insects to hurl their tiny bodies at it at full speed, 1 m/s. Let's say that all of them will hit the tongue depressor (at an angle normal to the surface) at exactly the same place, 10cm to one side of center axis of the bulb. If a fruit fly weighs .05 grams and the bulb requires 200 dyne-cm of torque to overcome the thread friction, how many flies must hit the depressor per second to supply the correct average force to advance the bulb? Assume elastic collisions where all momentum is converted to driving force, no heat and no bounce. Maybe there is some sort of gooey wad on the stick that controls deceleration rate with no heating.

Reply to Butch Shadwell at b.shadwell@ieee.org (email), 904-223-4510 (fax), 904-223-4465 (v), 3308 Queen Palm Dr., Jacksonville, FL 32250-2328. (<http://www.shadtechserv.com>) The names of correct respondents may be mentioned in the solution column.



March 2008 Calendar of Events (For more information see P. 1) *inside this Signal...*

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2	3	4 <u>5:30 pm</u> <i>IEEE FWCS ExCom TECO Tampa</i>	5 <u>6 pm</u> <i>Signal Processing USF p 7</i>	6	7	1 8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
<i>CMCT Conference, Charleston, SC</i>						
23	24	25	26	27	28 <u>PE/IA</u> <i>Transformer Seminar p 5</i>	29
30	31	1	2	3	4	5

Institute of Electrical and
Electronics Engineers, Inc.
Florida West Coast Section
3133 W. Paris
Tampa, Florida 33614



Florida West Coast Section, Tampa

NON PROFIT ORG U.S. POSTAGE PAID TAMPA, FL. PERMIT No. 1197

DATE SENSITIVE MATERIAL. DO NOT DELAY

Change of address? IEEE Web Contact Update <http://www.ieee.org/membership/coa.html>
Or send address changes including your name, IEEE Member number and all pertinent information to:
IEEE, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331 or call (800) 678-4333
Or fax your address changes to (732) 562-5445