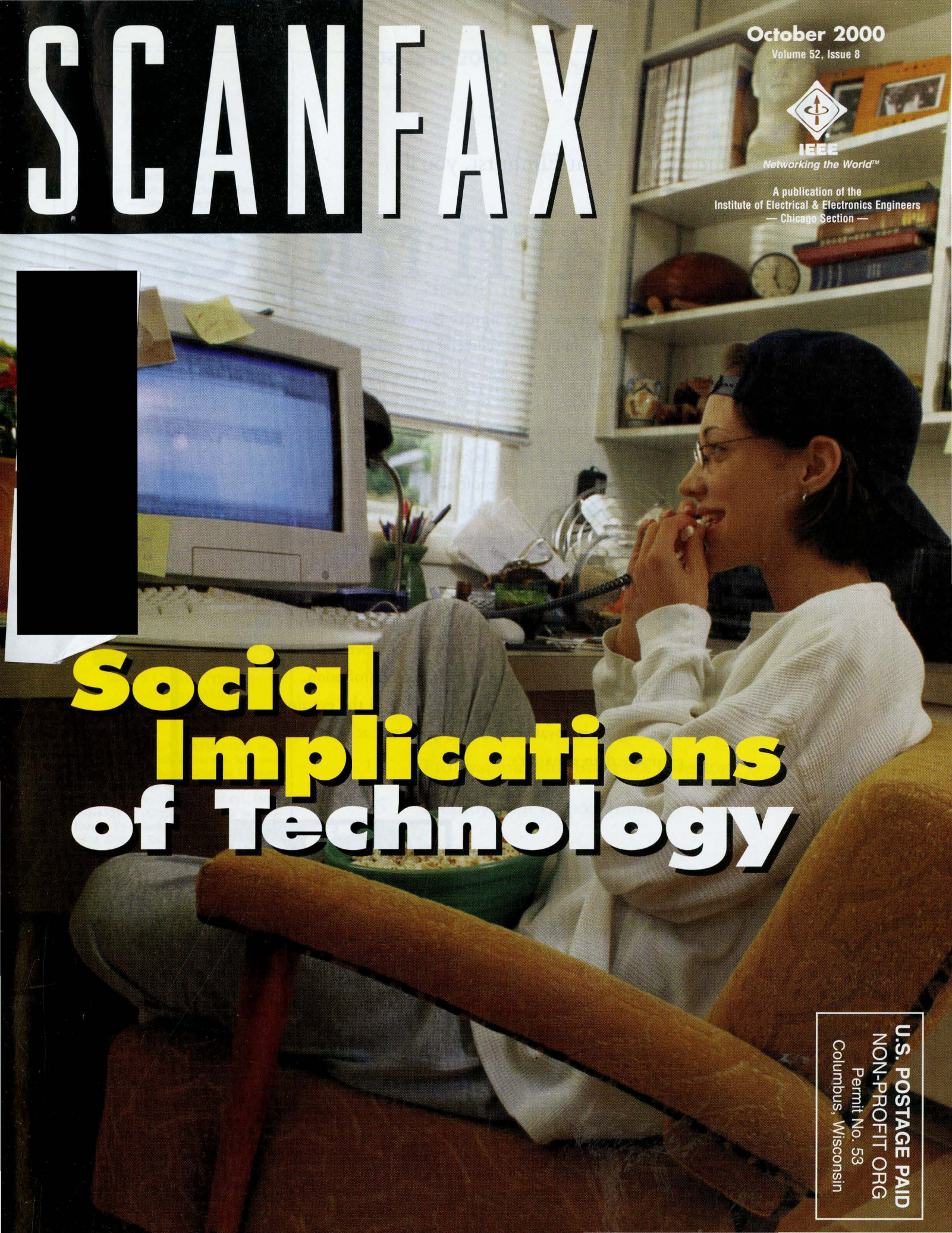
SCANFAX

October 2000
Volume 52, Issue 8

IEEE
Networking the World™

A publication of the
Institute of Electrical & Electronics Engineers
— Chicago Section —



Social Implications of Technology

IEEE
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A publication of the Institute of Electrical & Electronics Engineers — Chicago Section —

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Published for IEEE by Slack Attack Advertising

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Printed By
Town & Country Printers
Columbus, Wis.

SCANFAX (ISSN #0018-1297) is a monthly publication (except July and August) of the Chicago Section Institute of Electrical and Electronics Engineers, 8196 Cass Ave., Darien, IL 60561, (800) 898-4333 or (630) 493-4333. It is published by **Slack Attack Advertising**, 6400 Gisholt Dr., Suite 203, Madison, WI 53713, (608) 222-7630. Printing is by **Town & Country Printers**, Columbus, WI 53925. For **advertising information**, contact Slack Attack Advertising.

Subscriptions included in IEEE membership dues; non-member subscriptions: $25 per year.

Address corrections should be sent to the IEEE office, 8196 Cass Ave., Darien, IL 60561.

Meeting notices should be sent to pz@slackattack.com.

October 2000
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SCANFAX

Features

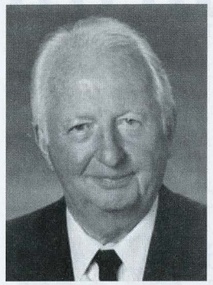
Departments

UPCOMING EVENTS

CHICAGO SECTION EXECUTIVE COMMITTEE MEETING
Tuesday, Oct. 10, 7:15 pm
DeVry DuPage, Room 230, 1221 N. Swift Road, Addison, Ill.
No Registration Needed

President's Message

Merrill W. Buckley, Jr.
2000 President, IEEE-USA



Merrill W. Buckley, Jr.

Note: *IEEE Chicago Section Chairman Patrick Murphy, E.E., P.E., is yielding his column to present a selection from the monthly "From the President" series IEEE-USA President Buckley has begun on the national Web site, www.ieeeusa.org.*

Age Discrimination

Though it is not true in all countries (Japan is a notable case in point), age discrimination in the United States is illegal. One would think this would permit engineering professionals to experience a lifetime of challenging rewarding work without the fear of unemployment during the latter years of their careers. But in age discrimination, the devil can very easily be in the details.

The pressures of global competition, corporate acquisitions and mergers, restructurings and plant relocations, cost-reductions, executive bonuses based on the bottom-line, etc., does not bode well for older, higher salary engineers. IEEE-USA is well aware of this.

Mark Twain said that when he was 15, he thought his father was the most ignorant man on the face of the earth. So he ran away from home to work on a Mississippi steamboat. He returned at 25, and was "amazed to find out how much the old man had learned in 10 years."

Too much of the discussion about age discrimination in our profession misses Twain's point. I hear it all the time — older electrical engineers' skills are out of date, their salary demands are too high, IT workers as young as 35 want a life outside the job so they are not as "reliable" as younger workers.

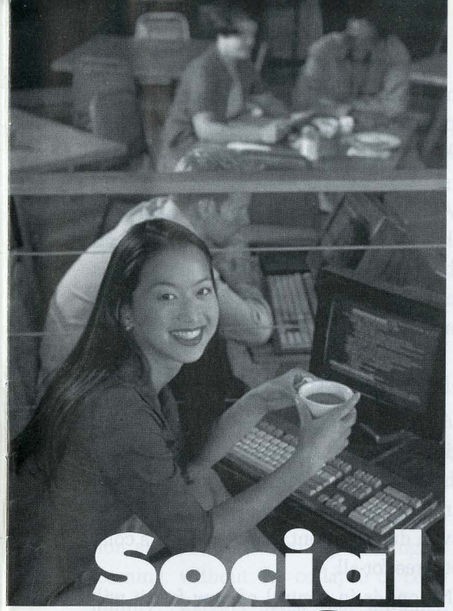
As the U.S. career services and public policy arm of the IEEE, with 230,000 U.S. members to represent, we are working to counter these false impressions. Our ongoing efforts on behalf of older members include: IEEE-USA's Older Workers Initiative begun by 1999 President Paul Kostek, the Age Discrimination page on our Web site, and the Older Workers Survey that is now in the field (with results due in June).

But why should younger IEEE members care about age discrimination? Consider what those who deny the serious evidence of age discrimination, particularly in IT, are really saying. I don't believe that as a group, older engineers have failed to keep up their skills. We all know that, as Twain might have put it, book learning isn't the same as job experience. Our profession changes so fast that, because we are a profession, being an electrical engineer means that you have to stay current to survive.

What those who claim that older workers must be out of touch are really saying, is that the IT industries are a short career. Get in at 25, get out by 40, and do something else for the rest of your life. If you can.

That is where the IEEE-USA, your advocate, comes in. We don't accept that our profession is a throw-away career. We believe continual improvement is vital. And we know that the value an engineer adds to our economy and our society grows with experience. Those who have now turned 40, 50 or older have the immeasurable benefit of keep-

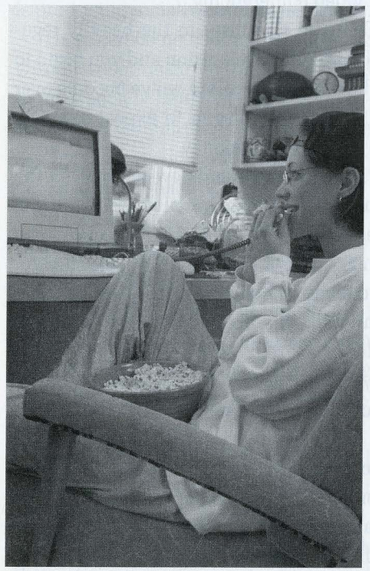
Continued on page 8



Social Implications of Technology

By Terri Biloff

The dawn of the new millennium is upon us. Will it be the ascension of power or the decline of morale? More than 90 million strong, the new generation will be entering our labor markets and will someday dominate the nation with its leadership.



A new culture is emerging, one which involves much more than pop culture and MTV. This new culture with its socially transmitted behaviors and attitudes, will be our leaders of tomorrow.

What will make the nation and those in it different than generations before them is the growth of technology and digital media. No matter how we look at it, technology is shaping our nation and will continue to impact the future of social and economic growth.

Parents are challenged with raising competent digital savvy children, while school officials and educators are grappling with the reality that students often know more, and are smarter when it comes to technology, new ways of learning and personal interactions than they.

Of the many parents I spoke to before writing this article, most notably the overwhelming fear is that their children will be technically savvy, but will lack the necessary social, leadership and interpersonal skills to obtain good jobs or maintain close relationships through a cohesive family unit.

Their fear is very real. And for most of us Baby Boomers, the technologies of our generation have had very little impact on our personal lives or social interactions. Sure we had the invention of microwaves, CDs and maybe even e-mail, but the new technology, the future technology is very personal.

And while we're all shaking our heads wondering how we'll ever learn it all, corporations are wondering what the future work force will be like as employees since they've grown accustomed to very different ways to work, play, create, and reward themselves.

Generation Netters

Until recently Baby Boomers were considered the largest population group. But now that group pales in comparison to the Generation-N which accounts for more than 35% of the population. Overshadowing even Generation-X, this new breed of children is not only technology savvy, but also socially conscience.

With ages ranging from toddlers to 18, their formidable years have been in an environment fundamentally advanced than their parents, and technically superior than their grandparents.

They've seen raw footage of combat on television, real-time surgeries online and technical advances most people from my generation remember from The Jetsons.

Yet to them, it's just another day in America.

Technically most parents fall short of their Generation-N children, and in some cases their children are doing laps around adults in many other areas of daily life experiences as well. The fact that Generation-N seems to be developing faster than previous generations does not imply the end of childhood as we know it, but rather a digital world to play in.

Playing Digital

Kids look at computers, digital media and other technologies the way we looked at TV when it arrived. No one really marveled at the technology, or wondered how audio waves are transmitted through thin air. We simply sat and watched the screen!

And when we went from 8-tracks to cassette tapes, it was like, "Okay, that's nice." You wouldn't have caught us trying to open the back of a television and see how it worked, or try attaching a battery operated toy to electrical circuitry to see if we could make it operate faster. Yet today's Generation-Ners will do just that.

Many experts agree children thrive on computers and other digital technology because they have control over the machine. And while kids are having digital fun, they're learning too. They read, comprehend, evaluate, investigate and have fun all at the same time.

When a group of youngsters were polled recently, the number one gift for Christmas was Nintendo or PlayStation, followed closely by, you guessed it, a personal computer. They personalize their computers and play equipment much like we personalize our bedrooms and bathrooms.

But everything does come with a price. And just as technology can improve the world, it can also be pretty tough on kids.

Hot Commodity, Different View

Adults often view new technology as a "hot device" that can make our life a little easier. It's often the symbol of Corporate America's strive for increased profits and sheer competitiveness.

But many adults have had to learn new technologies under duress to perform or remain competitive in the workplace, for youth mastering these skills are both fun and satisfying in their own right. Little thought is given to gross profits or productivity gains; they are hell bent on making sure their life is much easier than ours.

And the multi-million dollar companies making these video games, computers and techno-gadgets are capitalizing on the fact Generation-N expect more, are reaping the economic rewards over and over again!

A Revolution of Its Own

At the head of the technology helm is the digital Internet. Although the birth was rather methodical, prompted by government and watched over closely, the massive growth during recent years has been a complete free-for-all.

No one is in control of how fast it will expand, how it will be used, or what can be put out there. While remaining more of a text and graphical based medium, it is easily expanding to audio, full motion studio and video conferencing.

Compare this birth to the heavily regulated birth of the television and you begin to see how socially lenient we've become over the years. We've begun to expect more, in less time, for less money.

"I talk to my friends every night on the computer. It's great because we send pictures and stuff," said one Wisconsin elementary school student. It's not unusual for elementary schools to have four or more computers per classroom. Heck my own children started using computers when they were in senior kindergarten. Although much of the equipment is donated, one of the more positive aspects of the current administration is the development of stronger programs to support the efforts of local schools to purchase new equipment with access to the Internet.

While many adults are glad to see this technology used in the schools for research of current events and other social issues, they openly admit they are concerned there are not enough safety measures built in, to keep children from wandering into places they shouldn't be.

So in step the next generation of enterprising companies, keeping the economy strong by combating the multi-million dollar companies responsible for the inappropriate content. And so the revolution continues.

Higher Learning/Lower Social Skills?

There is much to be said of social interaction and the importance of community building. A new culture is emerging, one which involves much more than pop culture and MTV. This new culture with its socially transmitted behaviors and attitudes, will be our leaders of tomorrow.

But how much longer can the generation endure the technology and higher learning, without the collapse of community? Experts agree that although technology is important "too much information all causes undue stress," and while the Internet in all its glory has blessed us with wonderful technology, it is producing socially-challenged people.

There can be no community building without relationship building. And as more of society jumps into their own little "virtual communities," we widen the gap between social exclusion and interpersonal relationships.

Transformation of Business

Imagine the impact of millions of "forward-thinking" people armed with powerful tools and knowledge filling positions in the workplace and leadership roles.

These fresh-thinking people will transform the nature of enterprise and will reinvent how wealth is created. With different assumptions about work than their parents, work, play, and learning are one in the same. And while businesses struggle to keep up with their competitors, they're also faced with a work force that may know more than the current I.S. Manager or department head.

Corporations have only begun to prepare for the challenge they will encounter. This is not some utopian call for everyone to be equal, but tomorrow's employees will expect to be respected for their knowledge, not discouraged for their ideology.

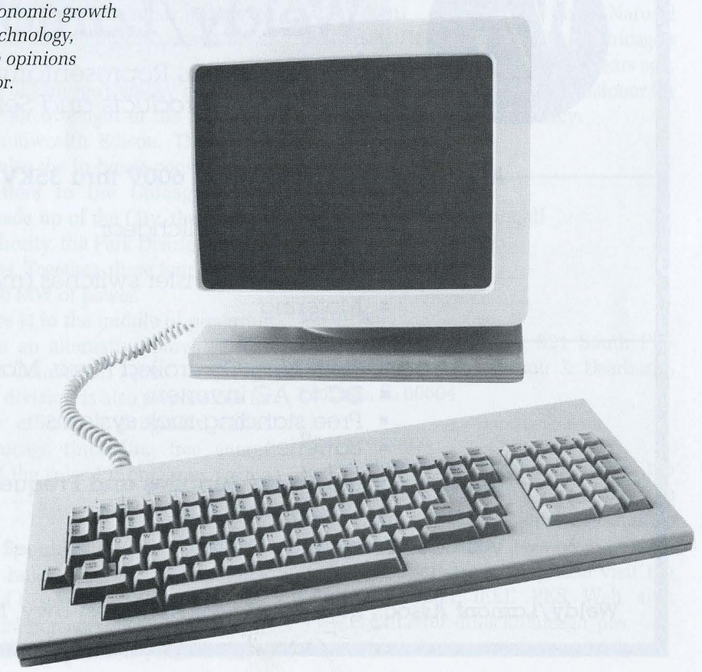
At a time when the corporate world is trying to reinvent itself through technology, society has already shed its skin and grown another one a hundred times through access to technology. And in an attempt to nurture the free spirit of the growing workforce, many corporations provide Internet access at work, lap top computers that can be taken home, and time off (during normal business hours) for involvement in community projects.

They know that without the existence of meaning employment and continuing education, most young people will leave and go elsewhere. The Generation-N group will dominate society, shape our economy and social structures, regulate the environment and impact the future of human existence.

Next month:
Antennas and Propagation/Microwave Theory and Techniques

The comments are not intended to predict the future of social or economic growth based on technology, they are the opinions of the author.

Imagine the impact of millions of "forward-thinking" people armed with powerful tools and knowledge filling positions in the workplace and leadership roles.



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ing their skills current through one of the most profound periods of accelerating technology in history. Those who are 29 today will be 39 and 49 a lot sooner than they might think.

Programmers whose newly minted skills are in Java and Linux might keep in mind that, 20 years ago, the newly minted skills were C and C++. What happened to COBOL and Fortran will happen to Java, too, and the same arguments might be heard again. "Y2K graduates with computer degrees are out of date," someone may claim in 2020. "Nobody does Java anymore, and Linux has moved parsecs since the invention of Digital Oxygen. We need younger workers who can do voice-response programming in Chinese ..."

Twain was right, if these changes occur, some who deny the obvious evidence of age discrimination now will be amazed to discover how far ahead of its time IEEE-USA was. But we're not going to let that happen, because we're already fighting for older workers — and younger ones — right now. ■

Calendar of Events

Date	Event
October 10, 2000	*Chicago Section* EXECUTIVE COMMITTEE MEETING
October 11, 2000	*Chicago Chapter of the IEEE Power Engineering Society* NEW ENERGY MANAGEMENT PROGRAMS IN THE CITY OF CHICAGO
October 18, 2000	*IAS/IES Dinner Presentation* SURGE ARRESTOR AND APPLICATION

CHICAGO CHAPTER OF THE IEEE POWER ENGINEERING SOCIETY

New Energy Management Programs in the City of Chicago

Wednesday, October 11, 2000

EVENING MEETING

Steven Walter, *City of Chicago, Assistant Commissioner for Energy Management and Policy*

About the Topic:
Mr. Walter will present an overview of several new energy management programs administered by the City of Chicago via the Department of the Environment, Energy Division. These programs provide important benefits to the City's residents, as well as manufacturing, commercial, industrial, governmental, and non-profit consumers of energy.

The City of Chicago's energy division is responsible for oversight of the Franchise with Commonwealth Edison. The energy division is also the in-house consultant on energy matters to the Chicago Power Alliance, made up of the City, the Chicago Transit Authority, the Park District and the City Colleges. Together, these four agencies use over 350 MW of power.

The Alliance is in the middle of procuring energy from an alternative provider. The bids are due October 11, 2000.

The energy division is also responsible for the energy efficiency programs called Rebuild Chicago (including free energy audits), and the solar PV programs within the City.

About the Speaker:
Mr. Walter holds degrees in Economics, Finance, and History. He attended the University of Scranton and the Ohio State University, where he pursued Ph.D. work. It took him three years, but he saw the light and dropped out of that program.

He has worked in the Engineering Department of Columbia Gas Corporation, the Performance Analysis Division of the Public Utilities Commission of Ohio, and the Strategic Planning Office of the Illinois Department of Energy and Natural Resources. He joined the City of Chicago's Department of Environment four years ago. He is currently Assistant Commissioner for Energy Management and Policy.

Time:
11:30 a.m. Social
12:00 p.m. Lunch (optional)
12:15 p.m. Presentation
1:00 p.m. Adjourn

Location:
Chicago Bar Association, 321 South Plymouth Court (Near Jackson & Dearborn), Chicago, IL 60604

Reservations:
Lunch tickets can be purchased in the lobby bookstore ($10.50). Please call the IEEE Business Office at (800) 898-IEEE to make your reservation.

For more information, please visit the Chicago Chapter IEEE PES Web site: www.ece.iit.edu/~flueck/chicago_pes.

IAS/IES

Surge Arrestor Selection and Application

Wednesday, October 18, 2000

EVENING MEETING

Arnold P. Vitols, Ph. D., Senior Design Engineer, ABB

About the Topic:
The present will review the topic of "Surge Arrestor Selection and Application." Basic arrestor terms such as distribution class, intermediate class, station class, gapped, gapless, MCOV, TOV, energy capability and pressure relief capability will be defined. Methods with sample calculations of sizing arrestors for grounded, ungrounded and impedance grounded systems will also be performed. In addition, application of arrestors for abnormal system conditions including altitude, temperature, seismic, wind, ice, and frequency will be discussed. Finally, selection for common applications such as transformer protection, shunt capacitor bank protection and high voltage underground cable protection will be reviewed.

About the Speaker:
Arnold P. Vitols received his BS, MS and Ph.D. in electrical engineering from the University of Minnesota in Minneapolis. He worked as a research and development engineer for seven years at General Electric's high voltage laboratory in Pittsfield, Mass. He then worked as a development and design engineer in the product department on metal oxide surge arrestors and series capacitor projects. In 1988, he moved to Westinghouse Electric Corporation (now ABB) in Bloomington, Indiana into the series capacitor projects group. From 1990 to 1999, he worked as a development and design engineer with porcelain and polymer housed metal oxide intermediate and station class surge arrestors. From 1999 to present he is responsible for developing and marketing new products and providing technical support to the ABB product department in Greensburg, Penn. He is a committee member of the ANSI C62.11 standards group, IEC advisory group and NEMA.

Location: The Como Inn is located at 564 N. Milwaukee Ave. in Chicago, just off the Kennedy Expressway (I-90/94) near Grand Ave. and Halsted St.

Time:
Social: 5:30 p.m.
Dinner: 6:00 p.m.
Presentation: 7:00 p.m.

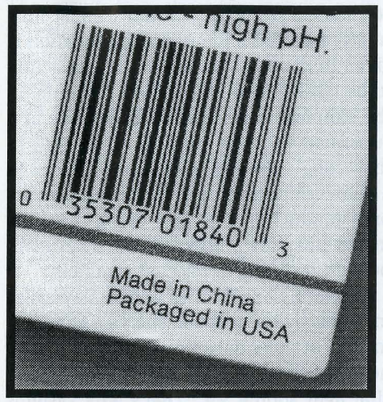
Cost: Your cost includes the presentation and your choice of chicken ($25 IEEE member/$30 non-member) or pasta ($20 IEEE member/$25 non-member) four-course dinner.

Reservations: Please call the IEEE Business Office at (800) 898-IEEE or (630) 724-0200 with your entree preference on or before Oct. 15th.

Note: For P.E. licenses that require continuing education for renewal, attendance at IEEE Technical Meetings is acceptable as one Professional Development Hour (PDH) per meeting.

CAST ACRYLIC WINDOWS

Provide Ultimate Protection and Performance for Barcode Scanning Applications



ADC system designers have implemented new barcode methods that go far beyond conventional systems.

Accurate scanning methods are now a critical part of the automatic data capture (ADC) system that identifies, tracks, directs and controls inventory of virtually all goods along the supply chain.

That is why high-quality lenses are needed to guarantee that the scanner will "see" the correct bar code and convey the necessary information accurately to the ADC system, according to Tom Fabek, V.P. Sales & Marketing for Dawar Technologies, Pittsburgh, Pa.

Fabek described his company's Diamond Hard lenses made of Clarex acrylic sheets supplied by Astra Products Inc., Baldwin, N.Y. "Our lenses are designed to prevent the reflection of light, protect the electronics and have the physical hardness to resist breakage, scratches, dents and mars that may cause a barcode scanner misread.

"The use of bar codes has become commonplace in manufacturing and warehousing environments, building security systems, and store check-out counters, and the ability of the scanners to accurately and automatically identify people, places, and things is paramount to process efficiency. While bar codes have traditionally served as an automatic identifier for products, cartons, pallets and locations, ADC system designers have implemented new barcode methods that go far beyond conventional systems."

Dawar Technologies is a leading manufacturer of graphic overlays, smart cards, membrane switches, nameplates, labels, roll labels, decals and N'CAPs. "Approximately 15 years ago, we recognized a trend

toward high quality graphics printed on plastic media and we quickly made the transition," Fabek explained. "We developed an expertise in laminating, hard-coating, texturing, die cutting and laser cutting of all types of plastics. This expertise allowed us to easily enter into the high-tech electronics industry.

"Our Diamond Hard product line of windows, filters and lenses for high-performance displays and barcode scanners is the ideal solution to the durability and performance demands of new electronic hardware. We have the ability to customize the material's mechanical properties and then create profiles and shapes to match the application."

ADC technology can be found in virtually every industrial application. The technology has advanced from data capture and information management within one department in one facility, to company wide, including customers and suppliers.

Bar codes continue to dominate the industrial market and equipment manufacturers are pushing the envelope to make scanners, printers and terminals an integral part of the data stream. Portability of data capture and data management systems continues to be the focus for systems integrators.

Protecting Accuracy

"Key to the performance of barcode scanners is readability. If the scanner misinterprets a code, the wrong information is given to the host causing the wrong action to be taken," said Fabek. "For example, in the simplest terms a misread barcode in a supermarket check-out lane will result in the wrong price charged to the customer. In a more critical example, a misread barcode on a production line may cause the automated assembly process to omit a key component, resulting in rejected products.

"Several contributing factors may cause misreads by the scanner, such as: misalignment of scanner to barcode, scratched scanner lens, glare or reflections from an outside light source, etc. That's why systems designers strive for the ultimate combination of durability and performance in scanning equipment.

"We designed our Diamond Hard acrylic sheet to virtually eliminate readability problems associated with scanner lenses. The Diamond Hard windows, filters and lenses are produced using a Clarex cast acrylic raw material. During the casting process we can alter the material to meet specific needs of the scanning process."

"We have used several materials for our graphic overlays and membrane switches, but the barcode scanner application posed an interesting challenge," added Fabek. "Typically, polycarbonate is used in barcode scanners because of its impact-resistance properties. However, the material is very soft and scratches easily, which may result in a scanner misread. Our challenge was finding a scratch-resistant, impact-resistant material with excellent light transmission properties.

"We tested a variety of thermoplastics; materials that can be melted and re-hardened without changing the basic compound. Acrylic proved to be the solution due to its mechanical and physical properties. However, three processes can be used to produce acrylic sheets: injection molding, extrusion and casting. Thermoplastics that are injection molded or extruded are not stress free - one side will be stronger than the other, similar to a piece of wood that tends to warp. Whereas, the casting process produces a stress-free acrylic sheet, ideal for the barcode scanner application."

Casting starts with a liquid base, then pigments and catalysts are added to form a semi-hard mixture. This syrup-like mixture is poured into a mold and cured by a series of temperature controlled baths. The result is a stress-free acrylic with superior optical qualities and a pencil hardness of 2H. Also, the cast acrylic is more chemical resistant and weatherable than extruded or injection molded materials.

Fabek concluded, "We contacted Astra Products, the supplier of Clarex acrylic sheets, to provide the very thin sheets needed. Astra developed their expertise in Clarex thin sheet, optical quality acrylics by producing watch crystals. The minimum thickness produced is 0.008-inch.

"When selecting Diamond Hard products three characteristics of the material are specified based on application; thickness, color and surface finish. Sheet thickness does not affect light transmission or color; however, the least expensive thickness produced is 0.04-inch (1 mm) and cost increases as thicknesses are decreased or increased."

Diamond Hard products are produced in five different non-glare finishes. The "roughest" finish provides the greatest glare reduction, but image clarity will be the lowest. The five non-glare finishes are mechanical matte surfaces (varying degrees of roughness) to reduce glare. The standard non-glare surfaces are cast directly into the sheet, eliminating the possibility of delamination or peeling. All sheets can be ordered with scratch-resistant hard coating that increases pencil hardness to 6H, anti-reflect coating and many special coatings on one or both sides.

Material color is specified to application requirements. For example, barcode scanners use red windows that are matched to the wavelength of the laser. Colors and light transmission can be customized to match unlimited applications.

Clarex specifics

Clarex optical quality acrylic sheets are specially formulated to optimize performance of LCD, LED, BVFD, EL, PD and other flat displays. Cast in lightweight acrylic in a wide range of neutral grays and colors, Clarex sheets offer high light transmission, weatherability and impact resistance. Clarex sheets are currently used in industrial instrumentation, marine and automotive electronics, cell phones, note book computers, video cameras and avionics, among others.

Clarex sheets provide excellent protection to the display while enhancing contrast and minimizing glare. Cell cast using a proprietary technology, Clarex sheets offer literally thousands of configurations to meet every flat screen application.

Sheet thicknesses range from 0.008-inch to 0.197-inch and are available in clear as well as many special formulated colors. Special coatings and filter types are available for special applications such as EMI shielding, conductive, scratch resistant, anti-bacterial, anti-reflective and others. ■

More information on Clarex sheets is available from Astra Products at www.astraproducts.com.

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