

The Informer



a newsletter for the electrician

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Mike Rowe Testifies Before Senate



Creator, executive director, and host of Discovery Channel's "Dirty Jobs" talks before the Commerce, Science and Transportation Committee.

Mike Rowe in the past seven years has traveled to every state and worked in almost every industry, in small towns where people do jobs to make life easier for us.

Mike spoke before the Senate in tribute to his grandfather who was a master electrician and "jack of all trades."

Helping his grandfather and father dig up the yard to repair a plugged sewer line at a young age was one of his favorite days ever with learning how to repair things.

Ten years later his toilet did the same but instead of participating in the repair he called his landlord and left a check on the kitchen counter and went to work.

When he came home the repairs had been made and the mess cleaned up. He never met the plumber. But it was then that Mike realized he had become disconnected from a lot of things that use to fascinate him when he was growing up. Mike no longer thought about where his food came from or how my electricity worked or who fixed my pipes or made my clothes. He didn't think about who made anything. There was no reason to. He was less interested in how things got made and more interested in how things got bought.



After a long weekend visit with his grandfather he decided to do a TV show in his honor.

Now he was invited to speak before the Senate Committee.

He started his five minute presentation with: I believe we need a National PR campaign for Skilled Labor, like a big one! We need to reconnect the country with the most important part of our work force.

Right now American manufacturing is struggling to fill 200,000 vacant positions. And today there are 450,000 openings in trades, transportation and utilities.

The skills gap seems real and its getting wider. In Alabama a third of all skilled tradesman are over 55 years old. They are retiring fast and really there is no one there to replace them.

In Atlanta a power plant construction was delayed not because of a lack of funds but a shortage of welders.

People are surprised to hear when there is high unemployment and we have a labor shortage. But they shouldn't be surprised as we have pretty much guaranteed it. In high school, vocational arts have all vanished and we've elevated the importance of higher education to such approach that all other forms of knowledge are labeled alternatives.

We talk about creating millions of shovel rated jobs for a society that doesn't really encourage people to pick up a shovel.

In a hundred different ways we have slowly marginalized an entire category of a critical profession. We've shaped a good job into something that no longer looks like work.

(continued on page 8)

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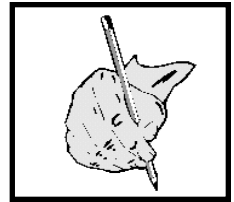
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Reader's Comments

Tom Henry would like to hear from you.
 Please send your comments and suggestions to:
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I am the Lead Service Tech for my company. We had problems with some techs' diagnostics on HVAC and white goods. They were just throwing parts at the problem. I am not available to go over every one of their jobs as I have my own to do. It was brought to my attention to do something about it. I thought about you guys.

What feels like a hundred years ago, I was an industrial electrician in various plants over the years. I got some of your books and next thing, I was programming automation processors. So, with my current situation, I went back to your website. Lo and behold, you have HVAC TECHNICIAN ELECTRICAL listed. So I ordered 2 books and 2 CONTROL CIRCUITS books.

I put together a training class using schematics on a dry erase board, a mock-up test board, along with your book. Just a couple hours a week. Right out of the shoot, in just the first part of your book, these guys are understanding more about furnaces than they ever knew. I'm even learning some stuff.

If you put something together for white goods (household appliances) let me know.

David S. Watt
 Liberal, Kansas

My Favorite:

A concerned contractor asked, "What if I train them and they go to work for someone else?"

A trainer replied, "What if you don't, and they stay?"

WATT'S IN THIS ISSUE

Mike Rowe	Cover	Bob Williamson	10
Misc.	2	Bob Williamson	11
Renewable Energy	•Coy Jamerson 3	Seminar Schedule	12
Career Specialist	•Wayne John 4	Electrical History	13
Building Official	•Paul Ward 5	This Inventive Century	14
Florida License	•Tim Chinchor 6	UL Corner	15
Carbon Footprint	•Tim Henry 7	Learn to be an Electrician	16
Mike Rowe (cont.)	8	The Ultimate Code Book	17
My View	•Tom Henry 9	Florida License (cont.)	18
		Informer Subscription Form	19



Renewable Energy



With Coy W. Jamerson, III

Continued from Jan-Feb Informer

Finally there are maintenance issues to consider, especially if you are installing an off-grid system where backup batteries are used. There is an old saying, “take care of your tools and they’ll take care of you.” Some smaller wind turbines are simple machines that require little to almost no maintenance. However, bigger and other more complex turbines require more maintenance. Batteries have to be checked and replaced, connections torqued and a way to get out harmful gases from your storage room. A good wind turbine installation requires careful research and planning. Once you have done your own research on the annual average wind power in your area, specifically at your proposed site, and once you have gone thru the zoning and permitting process, you are now ready to proceed. There are several facets of the installation that are important to note. First, you will prepare and pour a proper foundation for your tower. Second, you will need an anchoring system to work with guyed wires that will bring greater stability and support to your tower. Third, you will need to plan the assembly and the raising of the tower. The attachment of the guyed wires, the use of a crane or other means and the installation of the wind turbine, electrical components and then the final check out are all important parts of the planning of the installation. A tilt-up tower may be a great way to go so servicing becomes easier.

As you know, Earth's surface is not flat. It is made up of hills, mountains, and valleys. This affects the direction of the wind and how hard it blows. As wind rides up the slopes of a mountain and is squeezed beneath the high ground and the upper atmosphere, it picks up speed. Air that is forced through narrow places between city buildings also blows faster. This is called the **venturi effect**.

EXAMPLE OF A TILT UP TOWER



A wind machine that has fixed rotors requires far less maintenance than those with variable pitch rotors. Also, direct drive turbines require less maintenance than those with transmissions. At a minimum, you should check the turbine and tower at least twice per year, once in the early spring and once in the fall before the winter season. Check the rotor for symmetry and make sure the blades all look alike. Check bolts on the tower and those that attach the wind turbine to the tower. Check for any signs of rust, corrosion or damage on all metal parts, including support wiring, clamps and foundation bolts. If you have a gearbox on your system, perform a thorough check on that and also be prepared to replace any bearings. Cleaning of blades is also important as buildup on them can reduce energy harvest. Painting may be necessary in areas where salt air or other damaging chemicals or agents may affect the integrity of the components of your system.

A wind turbine can be a very rewarding investment as long as care is taken to install it at the right location, the correct height and to properly maintain it. Be sure to equip yourself with as much knowledge as possible before making this renewable energy investment.

Stay tuned to the next article where we will continue to explore the exciting technology of wind power.

(Sources: Certain excerpts for this article were taken directly from books by Paul Gipe, NREL, wind energy sites and stock photos.)



Wayne John
CEO
Electrical Career Specialists

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Why is the Interview Process So Long?

Why does it take so bloody long to hire people? One would think that after the review of a résumé or online application, a phone interview and in-person interview, an offer should be tendered. Just a whimsical fantasy most of the time.

We have seen a dramatic hiring change since the current economic crisis (officially) began in 2008. It used to be easy. One interview, a few reference checks, then an offer. Now, we are experiencing multi-month interview processes. It's very simple: companies want to make sure that a bad hire doesn't happen.

This is no different from manufacturer to distributor to agency. With few exceptions, companies are requesting to see more candidates than ever before. Does that mean that those 'extra' candidates are worthwhile? Not necessarily. In any given region and for any job opening, there could be a multitude of good fits or only a handful; if at all.

More people to interview equals more time spent in vetting them out. While it also creates options for the hiring manager, it only works if those candidates meet the mandates of the open position in the first place.

If a company handles the entire hiring process themselves (without a recruiter), sorting through piles of résumés, emails or job boards takes a long time; even if one knows the qualities and experience they are looking for. Tragically, some companies have internal folks that don't completely understand how previous experience can translate into a good fit. This means that good people fall through the cracks and don't get considered. Who did they miss out on?

Once the phone interview is over, and there is enough interest to move forward, an in-person interview is scheduled and completed.

At this point, the hiring company has invested between three to four hours in one candidate. Break it down: one hour phone interview, one hour office meeting and add in the behind the scenes process of reviewing a résumé, discussing with others within the company, emails sent and received, phone calls made to the candi

date to determine mutual interest, and then setting up the initial phone dialog.

And that's just one person! Once we start multiplying those hours into more potential applicants, we can easily see why just that small part of the process takes up so much time. Depending upon everyone's schedules (both interviewers and candidates) things always get pushed back days or weeks.

Ah, but we're not done yet. Once there is a determination of a potential fit comes a second interview to discuss things more seriously. Again, if there are multiple contenders, this will add more time, but that's ok. It's when it starts getting to a third or fourth interview that things become unnecessary and really unfair to a candidate. Unless the position is a C-level, VP or above level, interviews should never go beyond a second in-person interview. Any other scrutinization can and should be done over the phone or conducted via Skype or another type of video interview.

We are finally at the end of an exhausting but necessary process. After all of the interviews, the social network investigations (e.g. Twitter, LinkedIn, Facebook, blogs, etc.), reference checks and background checks, an offer will be made. Hopefully patience and continued enthusiasm for both the company and candidate have not waned. Who is going to get the offer? Or, better yet, who is left after this process? Sometimes it is the person who has had the luxury of being able to wait. Others have moved on to other companies, decided that they are staying where they are or grew frustrated after waiting so long.

Interviewing people is still going to take a while as long as companies want to find and hire the best. People need to make sure that they are prepared to wait and just go with the flow. (The writer, Wayne John, is CEO of Electrical Career Specialists, Inc. ECS is a specialized staffing and recruiting firm exclusive to the electrical wholesale distribution community.



Manager: "I'm sorry I can't hire you. There just isn't enough work to keep you busy."

Applicant: "You'd be surprised how little it takes."



From the Building Official

**Paul Ward
Southlake, Texas**

Construction Education for the Next Generation

I attended more retirement parties in 2011 than in years past. Time goes fast when we are having fun and we like what we do. Until the other day, I did not think much about who will be filling the shoes of all the retiring baby boomers. It is hard to realize there may not be enough electricians to meet construction demands. A note to consider:

“Those born during 1945-1950 will start retiring in 2010-2015. There were not enough kids born in America between 1990 and 1995 to replace them.”

With the average age of an electrician at 47 to 50, the need for skilled workers is growing. There will always be a need for good electricians. We know it takes years of classroom and hands-on training before becoming qualified, so we should be thinking of ways to recruit and train the next generation electrician. Classroom training and working with an experienced electrician is the best way to learn.

I am thankful for Preston Porter and Robert R Jones, Preston Porter Electric in Abilene, Texas for training me to become a licensed electrician in 1977. He and his hard working Journeymen took time to train and guide me. They also encouraged me to obtain my electrical license.

There is also a shortage of electrical engineers and technicians. Many companies comment on how difficult it is to find experienced electrical professionals.

On November 2, 2011, the Construction Education Foundation of North Texas partnered with the National Center for Construction Education and Research, North Lake College, and TEXO to host a "Build Your Future in Construction" Career Day. Around 500 students from area North Texas High Schools witnessed equipment and crane simulators, welding demonstrations and contractors with over 50 booths and demonstrations. During the event a craft championship was held for HVAC, plumbing and electrical trades. Winners were awarded in all trades. Many of the contractors currently perform work in Southlake, Texas.

Comments like these are encouraging:

“The Build Your Future Career Day was one of the best industry wide joint efforts to educate our regions high school students. Focusing on not only the types of jobs available in construction but educating the students on the true value of a career in the construction industry.”

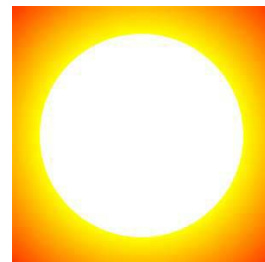
Great things come from working in the electrical industry. “It is a great feeling to be able to fix things. Whatever I do for the rest of my life, I will always be an electrician.”

Working with High School Students during career day also had students saying “I did not know this was a construction career” and “I want to do this”

The North Texas Build Your Future Day gave local contractors an opportunity to provide valuable information to help students consider opportunities in the construction industry.

We need to focus on hiring the next generation of electricians and reduce the labor shortage. High school technical training classes should be implemented to educate at a time when they are deciding their career. Don't pay people to wait for work but hire the people waiting in the halls.

THE SUN



Even though the Sun is more than 93 million miles away, we can feel its heat and light as though it were close by.

If you could drive a car to the Sun, and drove at a speed of 70 mph, 24 hours a day, 7 days a week without ever stopping you would arrive at the Sun in **152 years!**

Even from that great distance, it takes the Sun's energy only 8 minutes and 20 seconds to reach us on Earth while traveling at the speed of light.

How big is the Sun? It would take 109 Earths, placed edge to edge, to reach across the face of the Sun. And it would take one million Earths to fill the inside of the Sun.

From the Electrical Board



Tim Chinchor

FLORIDA LICENSE (continued from Jan-Feb Issue)

ES: Certified Specialty Electrical Contractor. This person has passed the state certified exam in the specialty category indicated on the license and is allowed to contract in the specialty category indicated on the license anywhere in the state. **Refer to Chapter 489.505(19), F.S., 489.511 and 61G6-7 F.A.C.**

ET: Registered Specialty Electrical Contractor. This person has a local competency card or occupational license for the specialty category indicated on the license which he/she has registered with the Electrical Contractors' Licensing Board (ECLB). He/she is allowed to contract in the specialty category indicated on the license, in the jurisdiction where he/she has a local competency card which has been registered with the ECLB. **Refer to Chapter 489.513, F.S., and Rule 61G6-7 F.A.C.**

(1) Lighting Maintenance Specialty Electrical Contractor. The scope of certification of a lighting maintenance specialty contractor is limited to the installation, repair, alteration, or replacement of lighting fixtures in or on buildings, signs, billboards, roadways, streets, parking lots and other similar structures. However, the scope of the certification does not include the provision of, or work beyond, the last electrical supplying source, outlet, or disconnecting means. **Refer to Chapter 489.511, F.S. and Rule 61G6-7.001(1), F.A.C.**

(2) Sign Specialty Electrical Contractor. The scope of certification includes the structural fabrication, erection, installation, alteration, repair, service and wiring of electrical signs and outline lighting. The scope of certification shall not include the provision of or any electrical work beyond the last disconnect mean or terminal points. However, a contractor certified under this Section may provide the electrical entrance requirements for metering and main disconnect of remote billboards or signs which are independent of any structure or building and which require no more than twenty-five (25) kilowatts at two hundred fifty (250) volts maximum. **Refer to Chapter 489.511, F.S., and Rule 61G6-7.001(2), F.A.C.**

(3) Residential Electrical Contractor. The scope of certification includes installation, repair, alteration, addition to, or design of electrical wiring, fixtures, appliances, apparatus, raceways, conduit, or any part thereof, in a 1,2,3, or 4 family residence not exceeding 2 stories in height, and accessory use structures in connection with the residence. The electrical service installed or worked upon is limited to single phase, 400 ampere single service. **Refer to Chapter 489.511, F.S., and Rule 61G6-7/001(3), F.A.C.**

(4) Limited Energy Systems Specialty Contractor. The scope of certification of a limited energy systems specialty contractor includes the installation, repair, fabrication, erection, alteration, addition to, or design of electrical wiring, fixtures, appliances, thermostats, apparatus, raceways, conduit, and fiber optics (transmission of light over stranded glass) or any part thereof not to exceed 77 volts, when those items are for the purpose of transmitting data, proprietary video (satellite systems which are not part of a community antenna television, cable television, or radio distribution system) radio frequency, central vacuum or electric locks, data distribution networks, home theater systems, surround sound systems, public address systems or telephone systems. (a) The scope of certification is limited to electrical circuits and equipment governed by the applicable provisions of Articles 725 (Class 2 and 3 circuits only), 770, 800, 810, and 820 of the National Electrical Code, 1984 Edition, or 47 C.F.R. Part 68.

(b) The scope of certification shall not include work performed by public utilities exempt under the terms of Section 489.503(5), F.S., or exempt due to the regulatory jurisdiction of the Florida Public Service Commission. (This specialty was formerly known as Low Voltage Systems Specialty) **Refer to Chapter 489.511, F.S., and Rule 61G6-7.001(4), F.A.C.**

(5) Utility Electrical Line Contractor. Utility electrical line contractor means a utility contractor whose business includes all type of transmission, distribution, and substation construction done for investor owned electrical utilities, city municipal electrical utilities, and cooperative under the rural electric authority between point of origin and point of delivery. **Refer to Chapter 489.511, F.S., and Rule 61G6-7.001(5), F.A.C.**

(continued on page 18)



Tim Henry

Vice-President
Code Electrical Classes Inc.



What's a carbon footprint? We all use a certain amount of energy and materials to keep us alive and to live the way we choose. The more energy used, the more carbon dioxide and other green house gases are created.

We in the United States are Carbon BIGfoots! Numbering about 312 million people, we make up just 5% of the world's population, yet we produce 24% (almost one quarter) of all carbon emissions on the planet! About 11 tons of carbon dioxide enters the atmosphere each year just to supply the energy used by a typical household in the United States.

Do you realize if you unscrew one incandescent lightbulb and replace it with a compact fluorescent lightbulb you are taking a small but important step toward reducing the destructive greenhouse effect?



The electricity saved by changing that single old-fashioned lightbulb to an energy saving compact fluorescent lightbulb can, during the life of that bulb, reduce the amount of carbon dioxide that would have been created to make electricity by 1,000 pounds.



One billion pounds of carbon dioxide would be taken out of the atmosphere if every family in the United States planted a single tree.

Did you know that a clothes dryer is one of the biggest energy hogs? An average household uses about 931 kilowatt hours of energy each year to dry clothes. When multiplied by the number of U.S. households (106 million), this comes out to 98,686 gigawatt hours. An average coal-fired power plant in the United States produces 3,400 gigawatt hours of electricity each year. So it takes 29 coal-fired power plants in the U.S. just to dry our clothes. An average coal plant in the United States emits more than 3.5 million tons of carbon dioxide into the atmosphere each year.

If each household washed one load of clothes in cold water, then hung the clothes on a clothes line to dry, this would reduce the amount of carbon dioxide emissions produced nationwide by 90%. That means 668 million pounds less carbon dioxide would enter the atmosphere.



In the last 60 years, the population of the Earth has tripled, and all of these people consume resources.

For years, human civilization has been living beyond its means. We have been consuming too much energy, resources, and land. Our energy supply poses particularly serious problems. Without energy, we cannot heat our homes or produce electricity, run factories or power cars. And we need energy to produce our food.

The material we use today such as coal, oil or natural gas have formed and accumulated in the Earth over the course of millions of years. Their quantities are limited. If our present consumption is continued our supply of oil will be gone in a few decades, and coal will be exhausted within a few centuries. Whereas energy sources such as sun, wind, geothermal, and biomass are always available and will never run out.



Gases in the atmosphere act like a plastic bag wrapped around Earth

Mike Rowe Testifies Before Senate

(continued from front cover)



A few years from now, an hour with a good plumber, if you can find one will cost more than an hour with a good psychiatrist at which point we'll be in the need of both.

I wanted to come here today because people like my grandfather are no less important to civilized life than they were 50 years ago. Maybe they are in shorter supply today because we don't acknowledge them the way we used to. We leave our check on the kitchen counter and hope the work gets done. That needs to change. My next testimony includes the details of several initiatives to close the skills gap all of which I have had the privilege to participate in, "Go Build Alabama", "I Make America", and "Dirty Jobs".

I'm especially proud today to announce "Discover Your Skills" it's a broad base initiative from Discovery Communications which I think can change perceptions in a very meaningful way. I encourage you to support these efforts because closing the skills gap doesn't just benefit future tradesmen and a company desperate to hire them it benefits people like me and anyone else like me that shares my views to pave roads, have reliable bridges, air conditioning, heating, and of course indoor plumbing something for all of us to consider during the next bathroom break.

•My view from the editor Tom Henry:

I read a recent article titled "Rising Costs Pushing College Out of Reach."

The story was about a couple that enrolled their son when he was born, in a 5-year paid tuition plan at \$173 a month and by the time he started kindergarten they had spent over \$9,500 to ensure his tuition was covered.

It was simple and affordable, with the emphasis

on *was*.

Today that same plan costs \$900 a month and \$49,000 for the same 5-year plan.

And the price is destined to go higher.

If we continue that sky-high trajectory for the next 10 years, as some expect it will, a tuition package in 2022 could cost \$200,000.

The result is, college is rapidly becoming out of reach for more people.

A growing number can't afford it upfront. And those relying on loans often graduate with staggering debt loads. Last year, total student debt in the U.S. topped \$1 trillion, surpassing credit-card debt for the first time, according to the Federal Reserve.

One of the lower tuition priced colleges tells incoming students that, while annual tuition costs \$5,700, students should expect to budget another \$14,130 for everything from books and computers to housing and health insurance.



•My point is, as you just read what Mike Rowe stated: **Right now, American manufacturing is struggling to fill 200,000 vacant positions. And today there are 450,000 openings in trades, transportation and utilities.**

As one studies the **Education and Training** criteria, it is frightening how low our country ranks. Businesses and public education have missed the mark when it comes to providing the fundamental skills and knowledge for companies to be competitive and the workers to be productive.

In 1983 the U.S. Department of Education published a letter pointing out that "we are a nation at risk" because of the shortcomings of our educational system.

We also heard about the "forgotten half" of high school students who were not being offered the kind of vocational-technical career education learning experiences that they could benefit from the rather than academic studies.

A college education: In general, our society has assumed and testified that a college education is essential to get anywhere in life but has failed to recognize the fact that a post-secondary vocational-technical education program, certificate or degree granting is also a college education.

Societal influences: Plato's concept of a fair and just society was one in which all people were able to achieve their potential. Look at how our society promotes that a college education is the key to success in life.

But about half of our high school students are not college bound, are not prepared for college, and will not benefit from a solid career preparation before they graduate high school. This forgotten half is robbed of their true potential. Career education, industrial arts, vocational education classes that prepared many of the Baby Boomers and our parent's generation are almost gone.

I want school teachers, counselors, and administrators to listen and respond to the needs of the communities they serve, not the politicians holding the purse strings. I want fair and balanced "career education" provided to school students beginning in the sixth grade. I want parents to realize that their future lifestyles, healthcare, and social security depend on the abilities of their children as meaningful and productive members of our society.



I want Patrick and Suzanne to learn that a vocational program can lead to secure and rewarding careers and that a one- or two-year post secondary vocational-technical is "college" too.

The very system that was intended to advance our children's education is actually leaving children behind—behind in careers and behind in life.

Skilled trades training grew out of apprenticeship training programs from the early 1900s through much of the 1970s and trade schools that sprang up in the early- to mid- 1900s. World War II gave birth to methods known as "Training Within Industry," which were followed by several decades of vocational-technical programs in high schools and community colleges/tech schools and Industrial Arts programs that put significant emphasis on hands-on work. These days, apprenticeship programs have almost disappeared and there are very few vo-tech programs targeting trade and industrial jobs. Because of this, and because so many companies cut back on their training departments and capabilities over the past, too many workers today have not been formally trained to do the work we ask them to do day in and day out.

Our futures depend on a highly skilled and knowledgeable pool of skilled trades workers.

The majority of jobs in the United States require post secondary technical education. This story is not told by most high school guidance counselors as they seek to place as many people in colleges as possible.

They are in college to improve their chances of making a good living. What they really need is vocational training. But nobody will say so, because "vocational training" is second class. "College" is first class.

They go to college because their parents are paying for it and college is what children of their social class are suppose to do after they finish high school. They may have the ability to understand the material in Economics 1 but they don't want to. They too, need to learn to make a living - and would do better in vocational training.

Government policy contributes to the problem by making college scholarships and loans too easy to get

The demand for college is market-driven, because a college degree does, in fact, open up access to jobs that are closed to people without one. The fault lies in the false premium that our culture has put on a college degree.

Finding a good lawyer or physician is easy. Finding a good electrician, plumber, mason - the list goes on - is difficult, and it is a seller's market. Journeyman craftsmen routinely make incomes in the top half of the income distribution while master craftsmen can make six figures. They even have work in a soft economy.



Their jobs cannot be outsourced to India

Successful people without a college degree, some were high school dropouts:

Bill Gates, Ted Turner, John D. Rockefeller Sr., Paul Allen, Milton Hershey, Dave Thomas, Steve Jobs, Julie Andrews, Steve Martin, Tom Hanks, Simon Cowell, Woody Allen, Steven Speilberg, Walt Disney, Henry Ford, Thomas Edison, George Washington, Benjamin Franklin, Abraham Lincoln, Harry Truman, Winston Churchill, Grover Cleveland, and the Editor.....



Maintenance

Robert Williamson
Mill Spring, North Carolina

Robert is an author, work-place educator, and consultant with more than 28 years experience in improving the people side of manufacturing and maintenance with many Fortune 500 companies. www.swspitcrew.com

Growing Your Own – Part 1

“Our maintenance workforce is getting older. And the qualified applicants for maintenance jobs are getting fewer. Where do we find our replacement maintenance technicians? How do we prepare them for these jobs?”

These questions have been and will continue to be front and center in every maintenance manager’s mind. Competition for top-skilled maintenance industrial technicians has exploded. The sources of qualified recruits have dwindled and are overtaxed. And yet our manufacturing plants, commercial and industrial facilities and our transportations fleets still need qualified technicians to assure their continued performance and reliability.

The era of maintenance skills shortages has been growing for more than two decades. It’s because of the “perfect storm” conditions I’ve discussed in previous columns: aging Baby Boomers, fewer young people entering careers in industrial maintenance, precipitous decline of vocational-technical education in our schools and an overemphasis on a college education by our society, our politicians and our schools. Couple these conditions with the myth that manufacturing is on the way out in America and you have the “perfect storm.” Riding this one out will take foresight, planning, out-of-the-box thinking and leadership.

In previous articles, I have spoken of several solutions: educating local school boards, teachers and administrators on your business’ needs for entry-level maintenance technicians; helping local and federal politicians understand the skills shortage situation in your business and others in your area; setting up in-house training programs and working with local community colleges. And there’s one more...

Grow your own maintenance technicians.

In many manufacturing plants and facilities, the seeds for growing new maintenance technicians have already been planted. They need to be cultivated, nurtured and harvested. Let’s explore how you can grow your maintenance workforce of the future right in your own facility.

Entry-Level Requirements

First, we must ask what is it that entry-level maintenance technicians must be able to demonstrate to be productive? Start with your current maintenance top performers’ abilities. Most likely, they started out with a good **mechanical aptitude and ability**. They were able to **work with their hands**. Their **problem-solving** skills and their ability to think through puzzles were superior. A good **healthy work ethic** goes a long way for success in maintenance. **Safe work habits**, the ability to **communicate** and **work with others**, coupled with **reading, writing and basic math** skills were also required to be successful. In today’s world, a working familiarity with **computers** and software is essential. And lastly, they were **able to learn** new skills, new machines and **follow written procedures**.

So, here are a dozen or so basic requirements to be an entry-level maintenance technician. Given this set of basic knowledge, skills and aptitudes, the entry-level person should be able to learn and master the job-performance requirements of a maintenance technician in your plant.

Look for Candidates

Second, we need to start looking for people with the entry-level requirements listed above. Consider your experienced production equipment operators and setup technicians. They have informally demonstrated many of these entry-level requirements in their present job role.

Some might be very senior employees, and others might be young upstarts who are getting a bit bored with their limited work assignments.

The good news is that they are already employed in your company. They know their way around.

They understand how things get done. And they have an obvious track record that is available for scrutiny. You can observe their actions and behaviors. You can discuss their potential with their current supervision. But this alone should not be a basis for selecting them to be an entry-level maintenance technician. It is a good starting point.

The Selection Process

Third is the selection process. If the plant has a collective bargaining agreement with a labor union, then the selection process you use must be consistent with that agreement. Generally, labor agreements state “the most senior qualified person” is to be selected for a higher-level job role.

Seniority—years of service—is the easy part. The challenges lie in the “qualified” part of the selection process. That’s covered on the next page.

Maintenance

(continued)

Interview and Check References

The next step involves initial discussions with the potential candidate's supervision and area management. Some businesses already have processes in place for selecting and promoting from within. Use these processes whenever they exist. In some cases, site leadership and human resources management get involved in making such a transition happen. The bottom line here is to open doors and seek their support for this approach to filling maintenance vacancies and/or preparing for the future.

The candidate interview process should be no different than when interviewing potential employees off the street. What are different are the reference checks and the discussion about work history with the candidate. Because they are current employees, they have a history with the company. This history, in many cases, is a matter of record and should be consulted. Because they have been an employee of the company, their work accuracy can be observed and is also a matter of record: quality reports, changeover times, equipment efficiency, productivity, etc.

Demonstrated Ability

This is the final step in selecting candidates from within the organization. This step answers the question: Does this person have the demonstrated ability to succeed in the proposed maintenance technician job role? Remember, they are not yet a skilled maintenance technician. They are a candidate. We are looking for the potential to succeed. Prior maintenance experience is a plus.

Without such a demonstration process, many companies use the probationary period on the job to assess a candidate's abilities to succeed in the job role. Without specific on-job performance requirements, this approach is time consuming, often ineffective and incomplete.

Let's start with the basic requirements listed above (assuming that these are consistent with your list). What is the best and fairest way to determine the candidate's abilities in each of these?

- **Mechanical ability:** work history and demonstration
- **Work with hands:** work history and demonstration
- **Problem-solving:** work history and demonstration
- **Healthy work ethic:** work history
- **Safe work habits:** work history

- **Communications:** work history and interview
- **Work with others:** work history
- **Reading, writing and basic math:** demonstration
- **Computers and software:** work history and demonstration
- **Able to learn:** work history and demonstration
- **Follow written procedures:** work history and demonstration

Demonstrated abilities must be based on actual job-performance requirements not some off-the shelf assessment process. I prefer simple simulations that allow the candidate to use the most basic tools of the trade interacting with actual parts and maintenance-related procedures. Because I am a mechanic, I'll outline a simple **mechanical simulation** for the candidate to demonstrate his or her abilities.

Step 1: Combine related requirements to be included in a simulation activity. From the list above: mechanical ability; work with hands; problem-solving; reading, writing and basic math; follow written procedures; able to learn

Step 2: Assemble simulation device(s) with basic tasks to be completed. Consider the application of bearings, shafts, threaded fasteners, cotter pins, gears or chains and sprockets, drive belts, hydraulic or air cylinders and controls, sliding components, cams, temperature/pressure gauges, spare parts, etc. Make sure this assembly reflects components and devices that are common to machinery in the plant.

Step 3: Write simple, straight-forward procedures (or work instructions) to perform specific tasks with the simulation device(s) consistent with procedures used by maintenance in your plant.

Consider tasks that involve measuring, alignment, adjustment for fit, sizes, part replacement, lubrication, taking readings, solving problems, etc.

Keep in mind the procedures (or work instructions) must have a standard for successful completion.

Consider these: The device must rotate freely with no binds, within 0.04 inches, plus/minus 2 degrees F, no safety violations, function properly, etc.

Step 4: Develop a sequence of procedures to be demonstrated and the methods to be used in setting up the simulation device. Be able to set up and show proper operating conditions of the simulation device. Write simple work orders that describe the problem to be solved on the device.

(continued page 18)

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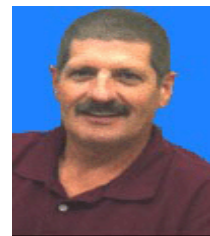
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History For The Informer

with Tom Henry

ELECTRICAL HISTORY



Sources of energy we use are:

PETROLEUM (oil) provides almost half of the energy used in the world.

COAL developed from the remains of plants that died 400 million years ago. It provides about 30% of the world's energy.

NATURAL GAS provides about 20% of the world's energy.

Others are *WATER POWER* which costs nothing, causes no pollution, and cannot be used up. However, expensive dams or other structures are needed as the water must fall from a higher place to a lower place.

WOOD, that was once the main fuel, is still a large source of energy.

NUCLEAR ENERGY from fission is also used to generate electricity. A huge amount of energy can be obtained from a small amount of fuel.

SOLAR ENERGY is used in small applications. It is clean and unlimited, but it needs a large area of land for the collectors and is interrupted by darkness and bad weather.

Coal is abundant enough to last 300 or 400 more years. It now provides about a third of the world's energy and about a fifth of the energy used in the United States.

The amount of fossil fuels (oil, natural gas, and coal) consumed in the United States has nearly doubled every 20 years since 1900. Between 1960 and 1980, the U.S. population increased by 25%. Total energy demand, however, rose by 80%. More than three times as much as the population.

As Nations shift from agricultural to industrial economies, vast increases in energy consumption occur for powering industry and for mechanizing and fertilizing farms.

A major trend in energy demand has been a dramatic increase in the use of electricity. In 1980 the U.S. used 380 times more electricity than it did in 1900.

Experts forecast that fossil fuels will still meet more than 75% of the world energy needs by the year 2000. By the year 2000, hydropower is expected to decline and nuclear power to increase to about 11% of the U.S. needs.

Environmental problems, particularly air pollution, will restrict the use of coal. Coal-burning plants release sulphur dioxide, which combines with moisture in the air to produce acid rain. This destroys forests and lakes, and damages buildings.

Natural gas, which supplies about 25% of the U.S. energy needs, is on the decline since consumption has exceeded the discovery of new sources. Experts predict that natural gas will satisfy only about 10% of the U.S. energy needs by the year 2000. The decline of reserves is a concern since natural gas is the cleanest fossil fuel.

Although hydropower is historically an important energy source, its growth potential is limited because few suitable sites exist for new hydroelectric plants.

Experts say the world's oil supply began declining around 1990, and by the year 2050 we will have used up the two trillion barrels of crude oil accumulated since prehistoric times. The conclusion is obvious and urgent! We must develop other available energy sources fast.

Solar power is still distant as the sun is too difficult to harness. It would take 8000 square miles of collectors. Example: A 7 foot diameter collector = 100 watts.

A greater growth is seen in the future for nuclear energy. Nuclear reactions are created by uranium. It is not burned like coal or oil, but produces extreme heat as the atoms are split. It's like a large furnace but no fuel is burning.

(continued next issue of the Informer)

This Inventive Century

The Incredible Journey of Underwriters Laboratories

1894 - 1994

With Tom Henry

Testing Building Materials, Airplanes, Automobiles, and Other Risky Things: 1906--20s

The 1906 San Francisco earthquake, which destroyed 25,000 buildings, served to further expand UL's activities, as UL helped the National Board of Fire Underwriters to develop building codes. UL also helped develop early National Electrical codes, and its engineers would help establish, and its research would be used by, numerous industry councils to develop safety codes. UL sought to help determine to what standards materials should be held. In the process, its engineers explored how a fire behaved, how fast a building would burn, and what effect a major fire would have on the structure and materials. To find those answers, it created massive furnaces.

In 1907 UL began testing roofing materials, directing the flames from 36 burners on a mock-up of a complete roof and dropping red hot discs on the material. Most roofs at that time were made of wooden shingles, but in 1916 UL gave a time rating for three kinds of roofing. In 1924 tests began on a new roofing material: asphalt.

In 1910 testing began on building columns, which were becoming important factors in building construction as more of the new skyscrapers were erected. A 1919 report presented landmark findings on the effect of fire on building columns, and the following year UL's Standard Time-Temperature Curve became a U.S. standard. That curve made it possible to give a fire rating to just about every type of construction. Also in 1920, UL began testing floors and ceilings, using two new horizontal test furnaces. In 1922 UL introduced the 25-foot-long Steiner Tunnel to determine how fast a controlled flame spreads. During ten-minute tests, engineers were able to calculate the surface burning characteristics of different products, and the Steiner Tunnel set its own standard as a testing mechanism.

Twenty-two years after establishing his lab, Merrill became the organization's first president who was a full-time UL employee. This occurred when UL became self-sustaining from the income generated by the testing fees paid by manufacturers and direct support from the insurance industry ceased. Merrill quickly established industry councils for burglary protection, casualty, electrical products, and fire protection to develop safety codes.

That same year, UL went international, opening an inspection office in London to check British products being exported to the United States. Over the next 80 years, UL would open more foreign inspection offices and develop partnerships with certifiers in other countries, ensuring that products coming into the United States met U.S. safety standards.

From safety matches (1908) to gasoline pumps (1911) to auto safety glass (1914) and locks (1915) to wooden ladders (1915) and x-ray machines (1915), UL tested and certified products beyond the direct danger of fire and electricity. In the early 1920s, UL tested and registered airplanes, issuing air worthiness certificates to 35 private and commercial planes (including a sea-plane). Those certificates were required to get insurance. For two years (1921--23) UL also registered and "Marked" pilots. One example from the UL "Rules of the Air" registered pilots had to follow was: "Airplanes shall always give way to balloons and airships whether fixed or free." UL's efforts helped support the establishment of the Civil Aeronautics Board in 1923, as the federal government assumed responsibility (and regulation) of air safety.

Also during the 1920s UL engineers continued to work with automobile manufacturers to test the parts that went into cars, from headlights to fuel systems to steering wheel locks. By 1924, UL had tested 700 automobiles. In 1923 Merrill died, and Dana Pierce became president. Pierce was president for 12 years and continued to expand the organization. UL opened a lab and office on the West Coast and another lab in Illinois, which tested high explosives and toxic gases. Consumer products Listed during Pierce's tenure included the first hot-water heater for home use, several coffee percolators, portable electric saws and drills, the Pianola player piano, waffle irons, and electric dishwashers, heating pads, and fans. UL also tested the first household refrigerators, issued the first radio Standard, and increased its work with electric motors and safes and vaults.



•The Story of *The Incredible Journey of Underwriters Laboratories* will be a continuing series in the *Informer* as we review the 100 years 1894 - 1994.



It is a flat cord that may be routed under carpet easier than round "Type S" cord.



Question: I have seen flat extension cords used in convention centers that are certified (Listed) convention cord sets, yet they are not constructed with hard usage (Type SJ) or extra hard usage (Type S) cord as is permitted to be laid on floors in the 2011 NEC Section 518.3(B) for temporary wiring in assembly occupancies. Are these equivalent to hard usage or extra hard usage cord?




These cord sets are certified under the product category Exhibition Display Units, Accessories (XNRU). Located on page 434 of the 2011 UL White Book. The guide information for category XNRU states that convention center cord sets are surface marked "Parallel Convention Center Cable for Temporary Tradeshow Use Only."

Since the printing of the 2011 White Book, the guide information for XNRU has been updated to clarify that the flexible cord required in convention cord sets is equivalent to extra hard usage cord. The updated guide information can be viewed in UL's Online Certifications Directory at www.ul.com/database. Please enter XNRU at the category code search field to access the guide information.

Answer: Yes. Convention center cord sets are required to be constructed with cord that is evaluated as being equivalent to extra hard usage or "Type S" cord. These cords are typically constructed of a flat type of jacketed cord, which is suitable for the abuses that it may be subjected to by being laid on a floor in an exhibit hall.



Electrical Construction Materials



Directory

***Note: Do you have copies of the UL WHITE and green book "Electrical Construction Directory"? Every electrical contractor should have access to these informative books.**

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- Etc.



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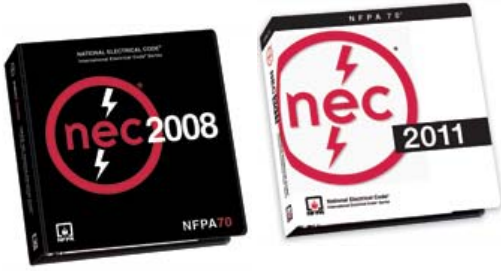
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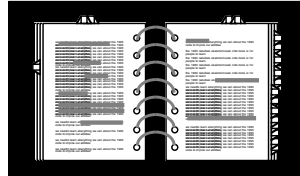
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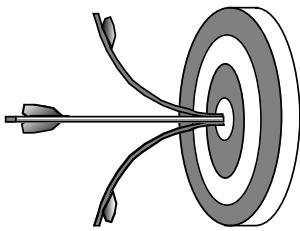
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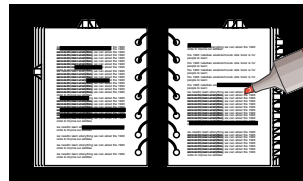


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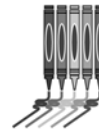
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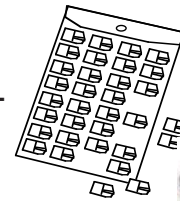


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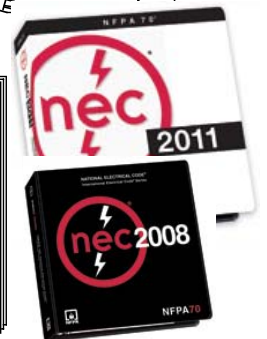
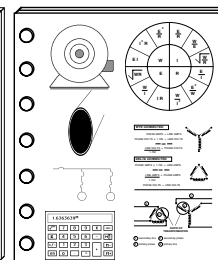
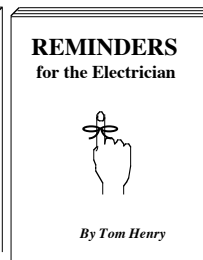
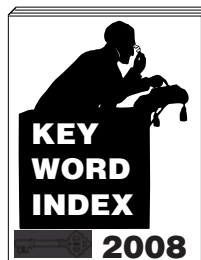
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Maintenance

(continued from page 11)

Step 5: Have several top-skilled maintenance mechanics attempt the simulated tasks using the work orders and procedures. Adjust the tasks, work orders, and procedures as needed.

Step 6: Set a reasonable timeframe for each task to be completed based on the times set by your top skilled mechanics. Consider that successful candidates may take three to four times longer since they do not have the same level of experience.

Step 7: Write up an administrative procedure that outlines how to set up and administer the assessment process using the simulation device. Get the appropriate approvals to proceed from leadership, human resources and labor union leaders.

You now have a basic skills assessment process that will assist in the selection of current employees who have the potential to succeed in a mechanical maintenance job role.

Setting Up Maintenance Training Processes

Next issue is **Growing Your Own – Part 2**, I will outline the approaches and methods for setting up a basic maintenance skills training program using in-house talents, on-line and off-the-shelf resources, and local tech schools (if available). Stay tuned...

Note:

(1) Assessments must be consistent with the *Federal Uniform Guidelines for Employee Selection Procedures* requirement for “job-content validity” based on current job performance requirements.

From the Electrical Board



Tim Chinchor

FLORIDA LICENSE (continued from page 6)

The following is a chart that breaks down types of licenses and what is covered under that category.



KNOW YOUR SCOPE

KEEP IT LEGAL

WORKING WITHOUT A PROPER LICENSE IS AGAINST THE LAW

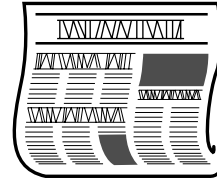
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EG	Certified Alarm System Contractor II	✗					✗			✗
EJ	Registered Residential Alarm System Contractor (489.537)		✗						✗	✗
EY	Registered Alarm System Contractor I (489.537)		✗			✗				✗*
EZ	Registered Alarm System Contractor II (489.537)		✗				✗			✗*
ES 043	Certified Residential Electrical Specialty	✗						✗		
ES 068	Certified Utility Line Electrical Contractor	✗						✗		
ES 065	Certified Lighting Maintenance Specialty	✗						✗		
ES 067	Certified Sign Specialty	✗						✗		
ES 069	Certified Limited Energy System Specialty (Formerly known as Low Voltage)	✗						✗		✗
ET 043	Registered Residential Electrical Specialty		✗					✗		
ET 065	Registered Lighting Maintenance Specialty		✗					✗		
ET 067	Registered Sign Specialty		✗					✗		
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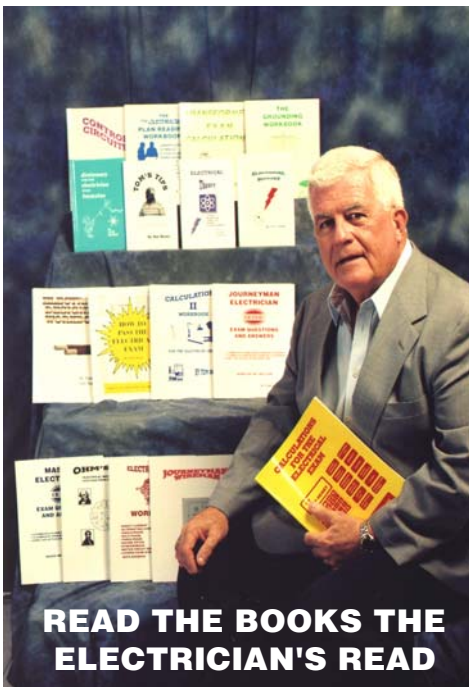
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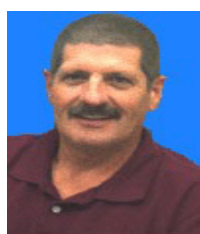
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