

- March Meeting – March 9th
- ACCWPA Social Outing
- Revolutionize Electric Motors

2023

Meeting Dates

March 9th

Board & General Mtg.
Contractor Roundtable
Back by Popular demand!
How do you **RETAIN** your
Top Talent?

Federated Insurance
Presenter: Justin Daul
Place: Carmody's

March 24th Friday

ACCWPA Social Outing
Giant Oaks Winery
Finleyville, PA
4:00 to 10:00 pm
Watch for the Flyer.

April 13th

Board & General Mtg.
Hire Dimensions!
Place: Carmody's

ACCWPA
Air Conditioning Contractors Western Pennsylvania

The mission of the Air Conditioning Contractors of Western PA is to assist its members in managing their companies more efficiently, therefore becoming more profitable, together with increasing their exposure and credibility within the community.

**DAYLIGHT SAVING
TIME BEGINS:
Sunday
March 12th**

2023 ACCWPA MARCH MEETING

Contractor Roundtable Back by Popular Demand – How do you **RETAIN** your Top Talent?

One good hire today could become a great leader tomorrow. This continuing presentation will examine how to help your employees develop into future leaders to better position them in your organization to have well-trained, experienced people in key positions. Managing the succession of talent is a vital strategic process that can minimize gaps in leadership and enable your best people to develop the skills necessary for possible future roles.

Justin Daul

Local Marketing Representative for Beaver County & Allegheny County.
Federated Insurance

Thursday, March 9th



4905 Grand Avenue (on Neville Island)
Pittsburgh, Pa 15225 - 412-458-1813 Upstairs meeting room.

3:00 pm – Board Meeting ♦ 5:30 – 6:00 pm - Social (cash bar)
6:00 - 7:00 pm – Contractor Roundtable Discussion
7:00 pm – Dinner Buffet and Social resumes (cash bar)

Dinner Buffet - \$45.00

RESERVATION FLYER ON PAGE 3

Friday, March 24th
ACCWPA SOCIAL OUTING
Giant Oaks Winery - Finleyville, PA

4:00 to 10:00 pm - Flyer Include!!

Save the date and Join us for some Socializing!

6 Technologies that Could Revolutionize Electric Motors

Electric motors are so versatile and durable that it is difficult to imagine a modern factory without them. Motors are found everywhere in production facilities, from the HVAC system's blower fans to the drive gears on machinery and the conveyor belts moving components across the floor. According to [Reliable Plant Magazine](#), electric motors account for 60 percent of industrial power consumption in America, making them a prime target for investment in efficiency.

According to the [Copper Development Association](#), a typical industrial electric motor can use between seven and nine times its initial purchase price in electricity every year, meaning that the return period on investments in high-efficiency motors can be very short. The CDA estimates that premium efficiency motors offer a typical payback period of between two and three years, even for facilities replacing perfectly functional older motors.

From Cars to the Plant Floor

The basic technology behind electric motors has changed little in the past 150 years. According to the [Karlsruhe Institute of Technology](#), the first electric motor was invented in 1834—44 years before the light bulb. And the AC induction motor was pioneered in 1889, using the same basic drive mechanism that still dominates on plant floors today.

Despite the induction motor's simplicity of design, new technological breakthroughs are poised to raise the induction motor's efficiency, longevity, and performance. The emergence of the electric vehicle market has raised the stakes for developing more powerful, efficient motors that can send cars further and faster between charges. Now, some of the technological breakthroughs that are transforming the automotive industry are making their way into industrial applications.

Fixed industrial motors differ from automotive electric motors in important ways, but there is still considerable overlap. For example, while almost all automotive motors are brushless direct current or permanent magnet synchronous motors, these motors share several components with the more rugged and cheaper alternating current induction motors that are typically used by industry. Improvements in rotor windings and heat dissipation may see their first applications in the direct current motors for electric cars, but these breakthroughs will quickly be adapted for use in alternating current designs as well.

Here are six advancements in electric motors that could influence manufacturing:

Die-Cast Copper Rotors

Most induction motors use a "squirrel cage" style rotor made of thin bars of conductive metal that can induce an electromagnetic field to drive the motor. In older motors, this "squirrel cage" is made of aluminum bars, which are less conductive than copper but far easier to work with.

According to the [Department of Energy](#), aluminum was preferred for older electric motors because its low melting temperature of 660 degrees Celsius made it suitable for die casting in the manufacturing process. Copper's higher conductivity promised a more powerful rotor, but its high melting temperature of 1083 C was unworkable with traditional die casting techniques.

A Department of Energy grant spurred the development of die casting materials that can withstand higher temperatures, leading to the availability of copper rotors for induction motors. The Copper Development Association reports that these highly conductive rotors can cut energy losses in the motor core by 12 to 15 percent.

Permanent Magnet Drives

Unlike induction motors, which have no magnetic field until an alternating current is applied to the motor's windings, a permanent magnet motor houses a powerful rare-earth magnet or ceramic magnet inside their rotors. This allows the motor to spin at variable speeds, as well as generating a stronger magnetic field in a more compact housing.

The Department of Energy reports that the primary advantage of [permanent magnet motors](#) is its superior power, which has made them the motor technology of choice in the electric vehicle market. They can achieve torque-to-weight ratios twice as high as induction motors, and they are capable of producing high torques at variable speeds, making them suitable for applications that would otherwise require an expensive and inefficient gearbox.

Continued on page 4

ACCWPA
Corner



*Integrity is the
essence of
everything
successful.*

**PEACE, LOVE
and JOY
thru out 2023!**

**SmartWords
One Kind
Word can
change
someone's
entire day!**

Inspiration

**Work
HARD
Dream
BIG
Never
GIVE UP**

Contractor Roundtable Back by Popular Demand – How do you **RETAIN** your Top Talent?

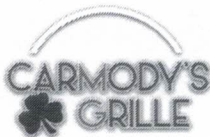
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Justin Daul

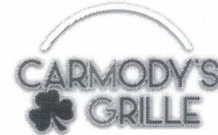
Local Marketing Representative for Beaver County & Allegheny County.

Federated Insurance

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Dinner Buffet - \$45.00

RSVP: 724-687-7860 (phone, email, or fax) – **NO cancellations after March 1st, noon!**

*** Important – RSVP is a must! ***

Email: pforker@accwpa.org or fax (724) 687-7860

Company _____

Name _____

Email address _____ Cell # _____

Dinner Buffet - \$45.00

NO Cancellations after March 1st - NOON. No shows will be billed.

**IF YOU ALREADY MADE YOUR RESERVATIONS, THANKS!
PLEASE PASS THIS NOTICE TO SOMEONE ELSE THAT WILL BENEFIT!**

6 Technologies that Could Revolutionize Electric Motors – continued

Unlike induction motors, which have no magnetic field until an alternating current is applied to the motor's windings, a permanent magnet motor houses a powerful rare-earth magnet or ceramic magnet inside their rotors. This allows the motor to spin at variable speeds, as well as generating a stronger magnetic field in a more compact housing.

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Square Wire Windings

The rotor of an induction motor is where the electric current flows. Running a greater length of wire through the rotor creates a stronger magnetic field, but the wires must be wound tightly to keep the magnetic field concentrated and within reach of the spinning stator that drives the motor's shaft. One electric car manufacturer has recently developed an electric motor that uses square copper wires in its rotors, eliminating the gaps that are inherent in winding round wires. According to [Motor Trend Magazine](#), motor's woven square wires generate a more compact magnetic field while requiring fewer delicate soldering points than competing winding technologies.

Tighter, more compact rotor windings should generate more torque in less space, and a rotor with fewer soldering points promises a longer lifespan and lower production costs.

Axial Flux Rotors

Traditional electric motors are "radial flux," meaning that their magnetic field is oriented perpendicular to the motor's rotation. This requires a relatively long cylindrical casing to house the electric motor's rotors.

According to research firm [ID Tech Ex](#), many car manufacturers are exploring axial flux motors, which use pancake-shaped rotors sandwiched around the stator. The axial motor's magnetic field is aligned with the motor's drive axle, allowing for a more compact design. Axial flux motors also place the rotor in closer proximity to the stator's windings, which opens the door for efficiency gains. These motors are being developed for the EV market, but they could have applications for industrial applications that require compact motor housings.

Switched Reluctance Motors

Induction motors use the natural oscillation of alternating current to switch the polarity of their electromagnetic field, which in turn drives the motor's rotation. But a new generation of switched reluctance motors are using advanced controller technologies to optimally control the polarity of the motor's magnetic field.

According to the [Department of Energy](#), switched reluctance motors are cheaper to manufacture than comparable induction motors, and they offer improved thermal management, requiring relatively simple cooling systems.

[Overdrive Magazine](#) reports that switched reluctance motors can match the performance of more expensive rare-earth magnetic motors without requiring exotic metals like neodymium. Switched reluctance motors also have the capability to control their rotational speed with much greater precision than induction motors, which are locked to the frequency of the electrical grid.

Trapezoidal Radial Flux

One of the newest innovations in electric motor design, the trapezoidal toothed rotors developed by an Israeli startup promise higher torque in a smaller package than competing radial motor designs. According to [Electric and Hybrid Magazine](#), prototypes of the trapezoidal radial flux motor deliver more power and suffer less heat loss than the brushless DC motors used in most electric vehicles. If this technology comes into commercial production, its ferrite-based version could compete with induction motors in industrial applications, offering a more powerful and compact alternative to traditional designs. For more energy efficiency resources, visit [Grainger Energy Services](#).

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Misc. Info

Every Job is a
**SELF-
PORTRAIT**
Of the Person
who does it.
Autograph your
work
with
Excellence!

AUTHOR UNKNOWN



ACCWPA Newsletter and all notices:

If you like to get our
ACCWPA Newsletter
send your
email address to:
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Not a Contractor or Associate member?

We'd love to serve you, too.

For additional information visit

www.accwpa.org

or call 724-687-7860

Email: pforker@accwpa.org

Additional reasons for membership are:

- Company membership applies to all employees of your firm.
- **NEW!! Contractors Free Associate Membership in Service RoundTable!!**
- Networking!!!
- Monthly meetings with informative presentations that benefit both the Contractor and Supplier.
- Relevant technical training and educational classes.
- 4-year Apprenticeship School with curriculum that is focused only on the HVAC industry!
- Monthly newsletters and email communications filled with industry information and updates.
- Insurance for member's company discount.
- Social Outings that everyone can participate
- And much more to come!

Join today!

ACCWPA is the Professional Alliance designed exclusively for today's HVAC/R Contractor!

2023

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Spring Begins March 20th!!

Membership Benefits...

Air Conditioning of Western PA

will continue to be your local industry partner,
as we have been since 1950.

Annual Membership Brings You the Following Benefits:

- Networking events
- Discounts on seminar
- Current info from local suppliers
- Legislative efforts
- Local website
- Technical training courses
- Apprenticeship program
State recognized
- Monthly newsletter
- Information of industry news
changes within the industry
- Insurance for member's company discount
- Code enforcement updates • Local lobbying
- ACCWPA Apprenticeship School
- Voice for the local contractors
- Golf Outing
- Education opportunities for your technicians
office staff
- Advocacy agenda promote contractor interest.
- Labor and HR legal advice before utilities
- Helping members to stay ahead of the curve
- 8 Monthly informative meetings



MARK YOUR CALENDAR!

ACCWPA Golf Outing

Quicksilver

2000 Quicksilver Road, Midway PA 15060

10:00 am Shotgun Start

Tuesday

August 15th

2023

Upcoming Meetings!

2023

General Meetings Schedule!

March 9th

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Contractor Roundtable Back
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**Work Hard in
Silence,
Let Success
make the
Noise!**

**Make
Today
Amazing!**

ACCWPA

Air Conditioning Contractors Western Pennsylvania



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Air Conditioning Contractors Western Pennsylvania

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Service Roundtable Affiliate Association



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"Be There Fund"

(Must be an ACCWPA member to Win!)

Next General Meeting - \$30.00

SPRING BEGINS – MONDAY, MARCH 20th!



126 Resolution Drive • Mars, PA 16046-3719

ACCWPA is the Professional Alliance designed exclusively for today's HVAC/R Contractor!

Membership Advantages:

Networking with other contractors. This source of information is invaluable in handling problems within your own company. ACCWPA members help fellow members to be successful!



ACCWPA distributes ACCWPA Newsletters monthly to members and selected non-members, so that all those in the HVAC/R industry can keep informed of issues regarding our trade, and Chapter activities. We hope the non-members will see this newsletter as an example of the quality services that ACCWPA provide.

Contributions or suggestions can be emailed to pforke@accwpa.org

ACCWPA is proud to be a Service Roundtable Affiliate Associate.



ACCWPA Upcoming Events

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