

F.V.E.A.A. NEWSLETTER

December 1992

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Batavia, IL 60510
(708) 879-8089

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336 McKee St.
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(708) 879-8089

Director

John Emde
6542 Fairmount Ave.
Downers Grove,
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(708) 968-2692

NEXT MEETING

December 18th @ 7:30
College of Dupage
Student Resource Center
Room 1046

Use Lambert Rd. Entrance, Lot 7 at the Southeast corner of 22nd & Lambert
Nonmembers are always welcome!

Director

John Stockberger
2S643 Nelson Lake Rd.
Batavia, IL 60510
(708) 879-0207

OK, OK, THIS REALLY IS YOUR LAST ISSUE!

Because in last months issue I neglected to insert the membership application. I am giving everyone another issue. But this really is your last issue of the year. Please renew your membership as soon as possible. Membership to the Fox Valley Electric Auto Association is open to the public. Anyone interested in electric vehicles or electric transportation are encouraged to join. The cost to join is \$15 per year from November to November. If joining in the middle of the year the cost is \$1.25 for every month remaining til November of that year. The cost for new members joining this month is \$15.00.

ELECTRIC VEHICLE AUCTION!

The recent announcement by the state of Wisconsin to auction off electric vehicles on Saturday, December 12th is the reason for early production of this months newsletter. Please see notice inside for more details.

Fox Valley Electric Auto Association

336 McKee Street
Batavia, IL 60510



First Class

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ADDRESS
CORRECTION
REQUESTED

John Emde
6542 Fairmount Avenue
Downers Grove, IL 60516
USA

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PRESEZ

I must start this column with an apology on a number of fronts. First of all, most of you who are planning on renewing your memberships must have noticed the lack of a membership application form in the November newsletter. Opps!

Second of all, I would like to apologize to those members who have been sending in great information for the newsletter and have not seen the results of their efforts. The reasons vary, but usually revolve around a time constraint for formatting the newsletter. Quite often the information is a form that needs to be reworked in order for it to fit. Lately I haven't had the time to typeset the information. By retyping, formatting and typesetting I can squeeze a great deal more info in each newsletter.

Thirdly, I need to apology to those who have requested information from me, or from the Club library and have yet to receive a response. Again, time is my worst enemy.

And finally to our member Neil Campbell in Katy, Texas who did not receive a number of newsletters this past year. I have found the error in the mailing list database and have corrected it. You should have received the last couple. I have also organized the library a fair bit and will make copies of the past issues and mail those to you shortly.

Please note the Wisconsin state electric vehicle auction notice in this issue. This maybe a great opportunity for some people to own a truly unqi electric vehicle (Every Pun intended). In breif the vehicles were manufactured by Uniq Mobility of Colorado. They contain a single 32 hp G.E. electric motor. The body is fiberglass on a V.W. frame. The 16 batteries are stored in a tunnel down the center of the vehicle and are easily removed using a battery tray/cart. The performance of one of these vehicles in operating condition is very impressive. Member Steve Clark has such a vehicle and I believe is quite happy with the vehicles performance.

Sincerely,

Douglas F. Marsh

MINUTES OF OCTOBER 20, 1992 FVEAA MEETING

The meeting was called to order at 7:40 PM by Vice President Ken Woods. There were 18 members and 3 guests present.

Treasurer Corel reported \$ 2,055.36 in the savings account and 865.47 in the checking account for a total of \$ 2920.83. The report was accepted by the membership. He also noted that 1993 dues were payable beginning with this meeting.

Vice President Woods announced he hoped to arrange a program on Lithium-Polyethelyne battery development by a speaker from Argonne for the December meeting. He also noted that according to an October 27th letter from Jean Crocker, Manager of Government Relations for GM, recently approved Legislation provides for a 10% Federal Income Tax Credit up to a maximum of \$4000 for purchase of an electric car. Members wondered if the legislation would apply toward the cost of a vehicle conversion. Three members will write to their congressman and inquire.

Member Frank Delmonico spoke to his dissatisfaction with the way in which new members were introduced and provided answers to their questions regarding conversions. He moved that each question deserved an answer which should be published in the newsletter. The motion was seconded by Member Woods and after considerable discussion was approved. This might also apply to the "Technical Question of the Month" proposed by Member Steve Clark which has not been implemented.

Member Delmonico also pointed out he did not regularly receive an updated membership list. After discussion, the members agreed that an updated list would be made available to the members in March, after annual dues have been paid and the list updated. The list **WILL NOT BE PUBLISHED IN THE NEWSLETTER** because some members do not wish to have their addreses and phone numbers widely circulated.

Members also thought an updated, revised FVEAA handout should be printed. Secretary Shafer agreed to prepare a draft to be distributed at the next meeting for comments.

Secretary Shafer announced that a Citicar was for sale by Sandra Scholz in Oak Park. Anyone interested should call her at (708) 524-1243.

The meeting was adjourned at 9:36 PM.

Submitted by

William H Shafer
Secretary

CITICAR FOR SALE

Sandra Scholz of Oak Park wants to sell her CITICAR. It was purchased in 1981 and taken out of service in 83 with the expectation that when her son reached high school age he would restore it to operability. This never happened. Since 83, it has been stored without batteries in her garage. It has all of the original equipment and a shop manual. To return it to operability will require some brake work and new batteries for the 48-volt system. She paid \$ 5400 new and is asking \$ 500.

Call her at (708) 524-1243 if your are interested.

ASK THE FOX!

Ask the Fox! is to be a permanent addition to the newsletter as a place for members to ask technical questions pertaining to electric vehicles. These questions will be received by member William Shafer who will direct the question to the best source, going out of the club if need be. These questions need not be technical in nature. Please submit your question to:

William H. Shafer
308 South East Dr.
Oak Park, IL 60302
(708) 383-0186

MOTION CONTROL
Innovations

Switch Reluctance Offers Integrated System

The ability to combine power and control electronics produces an integrated system in drive technology. These features make switch reluctance (SR) very attractive in a wide range of sizes and applications.

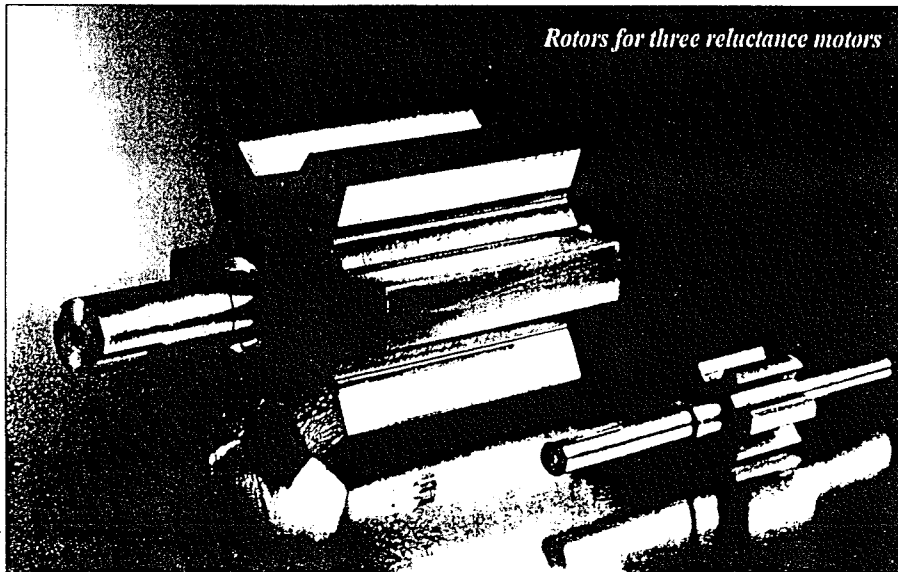
Switch reluctance drives offer unparalleled levels of efficiency, particularly when considered over wide ranges of power and speed. The motors are exceptionally robust, and well suited to hazardous environments. They are small in size — being never larger, and sometimes significantly smaller, than the more conventional DC or induction motors.

The advantages and the particular strengths of SR drives is their ability to combine in a single design many important qualities. They have a very high efficiency particularly under part load and excellent controllability due to the DC motor characteristics. Other features include "intelligent"/programmable characteristics and microprocessor control; high

torque/inertia ratio and rapid response; tachogenerator/encoder that is built in; and software-adjustable operational characteristics.

Figure one illustrates three different sizes of rotor. It also shows how there is a wide range of sizes which are possible and the hardness of the rotor. The smallest rotor shown was designed to produce a little less than 10 watts at 10,000 rev/min while the larger one produces 50kW peak at 750 rev/min with a constant power of up to 2,250 rev/min.

For more information contact SR Drives Ltd., Springfield House, Hyde Terrace Leeds, West Yorkshire.



Rotors for three reluctance motors

HIGH-PERFORMANCE POSITIVE PASTE FOR LEAD/ACID BATTERIES

NASA TECH BRIEF (V.16, NO. 10, ITEM #90)
 W-H. Kao, Johnson Controls, Inc., JPL

A newly formulated paste for application to the positive plates of lead/acid batteries imparts higher discharge currents and higher specific energy than does the conventional SLI paste. Other advantages of the new paste, designated F2, are that it contains no acid or free lead, no extra curing process is required, and the paste has high porosity, high surface area, and good strength.

In an SLI, lead/acid battery, the energy efficiency is usually limited to less than 50 percent of the theoretical value and is even lower at a very high discharge rate. One way to obtain a high power level at a high discharge rate is to increase the porosity of the paste. However, a plate covered with the conventional SLI paste loses its strength when the porosity becomes greater than about 60 percent.

The table shows the composition of the F2 paste and compares some of its other properties with those of the SLI paste. A plate 0.05 in. (1.3mm) thick made with the F2 paste is formed with about 20 percent surplus of theoretical capacity, as opposed to a typical 50 percent surplus of theoretical capacity for a conventional SLI plate of the same thickness. At a rate of 1 A/cm² the new plate delivers about 18 Amp hour per pound (Ah/lb), compared to about 6.3 Ah/lb for a conventional SLI plate.

The high porosity and surface area in the F2 paste are attributed to the large fraction of small pores with diameters less than about 500 angstroms. This, in turn, depends upon the presence of persulfate. If the conventional lead oxide with free lead is used instead of pure tribasic lead sulfate and orthorhombic lead oxide of the F2 mixture, high porosity and surface area cannot be achieved.

TABLE 1

	F2	SLI
Porosity	55% - 68%	55% - 60%
Surface area	4 - 7 m ² /g	1 - 2 m ² /g
Formation	135 - 165 Ah/lb	165 - 175 Ah/lb
% Utilization		
3 HR rate	45% - 68%	45% - 50%
@ 1 A/cm ²	15% - 20%	typically < 12%
Ah/lb @ 1 A/cm ²	16 - 20	5 - 10

TABLE 2

F2 COMPOSITION

33 % - 39%	3 PbO PbSO ₄ H ₂ O
38% - 45%	o - PbO
3.7% - 4.4%	K ₂ S ₂ O ₈ or Na ₂ S ₂ O ₈ (-325 mesh)
0.08% - 0.1%	fiber
the rest	water

SMUD NEWS

SACRAMENTO MUNICIPAL UTILITY DISTRICT,
Community Relations, P.O. Box 15830 Sacramento, CA 95852 -1830

Contact: Jane Goldman (916) 732-5591

October 22, 1992

FOR IMMEDIATE RELEASE

Downtown's first electric vehicle charging station opens

Downtown Sacramento's first electric vehicle charging station opened this week, helping make clean-running vehicles more practical for Sacramentans. Located at the County Parking Garage at 7th and G Streets, the station allows up to five electric vehicles to recharge their batteries when they are away from home.

"Giving the public better access to electric vehicle recharging facilities is critical to accelerate the transition to cleaner fueled vehicles," said Representative Vic Fazio, who took part in a ceremony to open the station. As vice chairman of the House Appropriations Subcommittee on Energy and Water Development, Fazio has been instrumental in the efforts to promote electric vehicles. "This will help put more electric vehicles on the road and that means less air pollution and less reliance on imported oil."

S. David Freeman, general manager of the Sacramento Municipal Utility District, said, "We want to make it as easy to own an electric vehicle as it is to own a gasoline-powered car today." SMUD plans to build another 70 charging stations throughout Sacramento by the end of 1993, and offer maintenance and repair services. Initially, electric vehicle owners will not have to pay for electricity at the charging stations, but a billing system will be developed. Starting November 1, the utility will offer a discounted EV rate that allows electric vehicle owners to purchase electricity at home during off-peak hours at about half the standard rate.

Freeman commended Rep. Fazio for the federal support he has secured in Congress for Sacramento's electric vehicle effort, including \$5 million for a program at McClellan Air Force base to develop electric vehicles, \$7 million to convert 24 RT buses from diesel to electric, and \$1 million to begin a southern extension of RT's light rail line. Another \$4 million federal grant to CALSTART, a statewide consortium to develop an advanced electric transportation industry, will create new, high value jobs for California.

SMUD is also working to attract EV manufacturers to the area. Two advanced electric cars were on display from two manufacturers considering moves to Sacramento -- Switzerland's Horlacher AG and Denmark's CityCom A/S. A California-based EV industry could generate more than 55,000 new jobs statewide by the year 2000.

"The development of an electric vehicle industry can help our state and region cope with job losses resulting in cutbacks in defense spending," said Fazio. "Electric vehicles will be a growing part of our future. Working with SMUD, we are trying to ensure that our community is second to none in the promotion of this new and emerging industry."

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STATE OF WISCONSIN VEHICLE AUCTION
DECEMBER 12, 1992

UW AGRICULTURAL RESEARCH STATION
ARLINGTON, WISCONSIN*

ADDITIONAL AUCTION ITEMS

PUBLIC INSPECTION: 1:00 - 6:00 p.m., Friday, December 11, 1992
and throughout Saturday's auction

AUCTION STARTS: 10:00 a.m.
Approximate time for Electric Vehicle Auction: 1:00 p.m.



A. ELECTRICAL POWERED VEHICLES

Several Battery Powered Automobiles
1978 - 1983 Models
Former Research Vehicles
Fiberglass Bodies
Approximately 3500 Pounds
Four Speed Manual Transmissions
Powered by 16 - 6 Volt Batteries
Moveable - but not operable - may be titled
Ideal Investment for Researchers or Collectors

*Located 15 miles north of Madison on Highway 151. Look for the
"Auction" sign.

BATTLE OF THE BATTERIES

BY RICK COOK

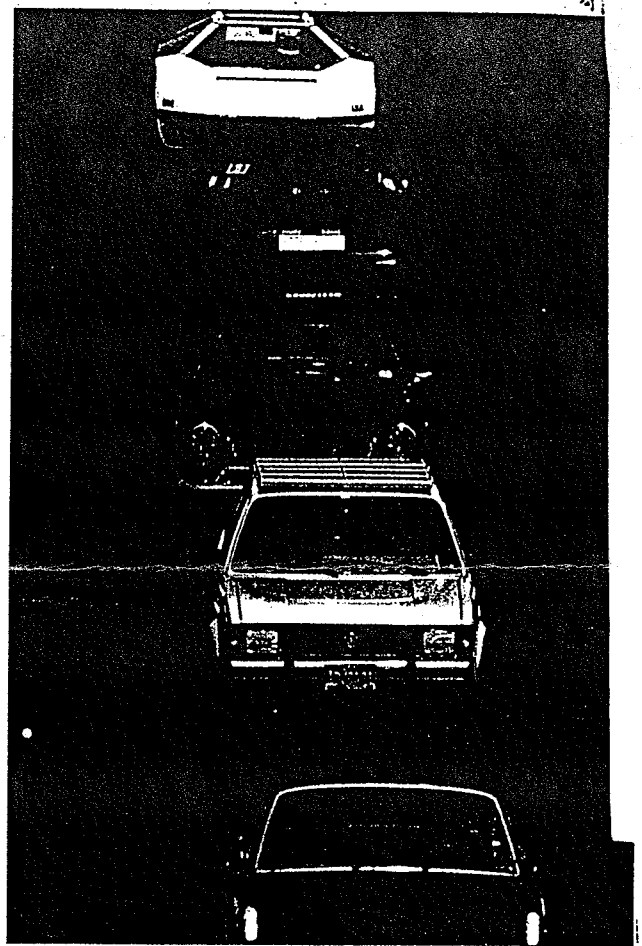
Batteries provided most of the technical interest at this year's Arizona Public Service Solar Electric 500 electric vehicle race—and a battery also ended the race. The three-day competition featured everything from solar-powered vehicles to hybrid gas-electric vehicles constructed by high school students, hobbyists, and small-volume manufacturers.

On the race track—the same as on public roads—the key to a successful electric vehicle is the battery system. The event showed off most of the major battery technologies that might power practical electric cars in the next decade or two. Entries in the electric stock-car race used lead-acid, zinc-air, zinc-bromine, nickel-cadmium and nickel-iron batteries. A vehicle with a sodium-sulfur battery ran demonstration laps and nickel-metal hydride batteries were on display in the exhibit area.

It became apparent early on that the stock-car race would be dominated by the exotic battery technologies. Although some of the lead-acid cars posted good lap times, they simply didn't have enough energy to keep the winning pace. In Saturday's Open race, which was run under different rules, several of the lead-acid cars changed batteries as often as eight times in pit stops.

A zinc-air-powered entry, sponsored by Arizona Public Service Co. and built by Dreisbach Electromotive Inc. (DEMI), was based on a modified Saturn coupe. On each of the three days of the event the car ran a one-lap race against a conventional Saturn used as a reference vehicle. The electric car never won, but by the last day the conventional and electric vehicles finished within half a car length of each other.

A zinc-air battery uses oxygen from the air and zinc in an electrolyte of potassium hydroxide. Less exotic than zinc-air, nickel-iron uses a base electrolyte, usually a potassium hydroxide solution. Nickel-iron

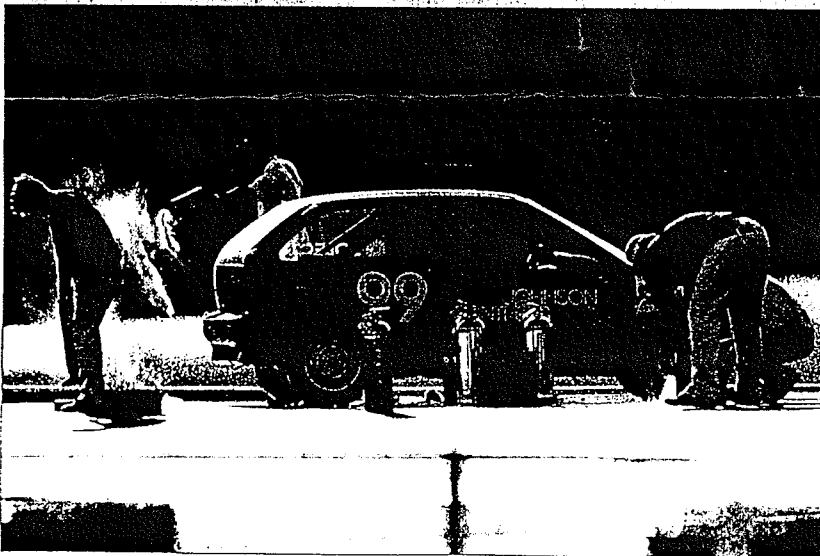


Entries at the Phoenix Solar Electric 500 car race used a broad range of battery technologies.

doesn't have the energy storage capacity of some of the other technologies, but it has nearly twice as much as lead-acid cells. With an energy density of 80 watt-hours per kilogram, the zinc-bromine battery packs about three times as much energy per kilogram as a lead-acid battery. This puts it behind zinc-air and sodium-sulfur in the energy-density sweepstakes, but it operates at room temperature, and doesn't need an auxiliary battery pack for burst power.

The meet's final event came to a sudden and dramatic end when the zinc-bromine battery pack started billowing red-orange smoke on lap 92. A battery fitting had come loose and both dark red bromine vapor and liquid bromine came pouring out of the battery casing in the Solectria Force made by Solectria Corp. of Arlington, Mass. Driver James Worden spun his car out on the edge of the infield, bailed out the window, crawled away from the car, and collapsed. Worden was airlifted to a nearby hospital and spent three days there. Fourteen other people who had breathed the bromine fumes were also taken to the hospital. Race promoters canceled the rest of the race and evacuated the track as a precaution.

Despite Worden's experience, and though none of the alternative batteries emerged from the races as a clear winner, the overall performance of the field demonstrated one fact quite clearly: The auto industry is getting closer and closer to producing a practical electric car suitable for the way the average American drives. Many of the cars in the electric stock event averaged more than 55 mph over the 91 laps of the race with the winner's speed at about 62 mph. 123



A bromine spill that started with an overheated battery in a Solectria Force sent several people to the hospital and prematurely ended the race.



Fox Valley Electric Auto Association, Inc.

Rev. October 19, 1990

MEMBERSHIP

A membership in the FOX VALLEY ELECTRIC AUTO ASSOCIATION (FVEAA) is open to everyone. Currently there is only one grade of membership regardless of the members degree of participation in association activities. Membership in the FVEAA is contingent upon payment of the annual membership fee. The membership fee can only be waived by special vote of the board of directors. Each member in the FVEAA receives a copy of the FVEAA NEWSLETTER each month. They are also entitled to attend and vote at all association meetings.

All memberships in the FVEAA run from November 1st to October 31st of the following year. The dues are \$15.00 per year payable at the November meeting. "NEW" members joining after November shall only pay \$1.25 for each month remaining before the following November. (see chart below)

Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
15.00	13.75	12.50	11.25	10.00	8.75	7.50	6.25	5.00	3.75	2.50	1.25

The following form may be used to apply for membership or to renew your membership.

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APPLICATION FOR MEMBERSHIP OR RENEWAL

Date _____

Name _____

Address _____

City _____ State _____ Zip _____

Phone # _____ Include Area Code

- Just interested in electric vehicles
- I have an electric vehicle (describe) _____
- I wish to build an electric vehicle

Amount enclosed \$ _____ for _____ months.

Make checks payable to: FOX VALLEY E. A. A.

Mail to: MR. Dale Corel, FVEAA TRES.
595 Gates Head North
Elk Grove Village, Il 60007