

# Fostering Innovation and Change in EV Motor Technology: An Interview with Wally Rippel



*Wally Rippel and Caltech Classmates in front of their all-electric 1958 Volkswagen bus*

In 1968, Caltech senior Wally Rippel and several classmates loaded into Rippel's 1958 Volkswagen bus, which had been converted to electric propulsion, and headed cross-country for MIT in Cambridge, Massachusetts. At the same time, a group of MIT students hit the road for Pasadena in an electrified 1968 Corvair.

*Who would be the first to reach their destination?*

While Caltech ultimately claimed first place in the Great Transcontinental Electric Car Race, the real winner at the time was the electric propulsion vehicle. As a young physics student, Wally Rippel was passionate about cars and clean air. He was committed then to the development of electric motor technology, and that passion has not waned in the decades since he issued that history-making challenge to MIT.

Rippel's vision, innovation, and discipline in advancing electric vehicle motor technology helped to build the foundation for companies like Tesla Motors. Rippel co-founded AC Propulsion in 1992 and is currently AC Propulsion's senior scientist working on the next generation development of induction motors and power electronics for electric vehicles (EVs). He has worked on advanced EV propulsion components with Caltech's Jet Propulsion Laboratory, AeroVironment and Tesla Motors. He received a BS in Physics from Caltech and an MS in Electrical Engineering from Cornell University. Rippel holds 26 U.S. patents with three more in progress. His number one passion remains environmental protection.

Five decades since that history-making VW bus ride, Rippel spoke to editors of the Copper Rotor Induction Motor website on what it takes – individually and collectively – to foster innovation and champion change.

## On Fostering Math and Science:

"It's disturbing to me that there are many smart young people graduating from our finest universities today who lack interest in the creation of new things. It seems they are more interested in the redistribution of old wealth rather than the creation of new wealth."



*Wally Rippel and his Volkswagen bus, converted to a fully electric vehicle for the cross country race against MIT*

"We need to teach students to have fun while learning math and science so they will become passionate about this area of study and work. These are the people who will develop a new idea that will revolutionize people's lives."



Under the hood of the BMW Mini E with AC Propulsion's drivetrain components

## On Innovating:

"Innovation is not a right or left brain thing. It requires both sides. Without the mechanics of training and discipline, the right side has nothing to work with. And without the playful creativity of the right side, nothing truly new is achieved no matter how many skills are at hand. A great musician needs the skills of an instrument and an understanding of music. But he also needs to experiment. The same is true for science and math. A solid foundation in the basics is requisite. But without learning how to 'play,' nothing new can be achieved."

## On Championing Solutions:

"I became interested in electric vehicle technology back in the 1960's when I attended Caltech and the smog in the Los Angeles area was terrible. In our history class we talked about the roles of the government and private enterprise. We debated whether the government should be responsible for developing new technologies or if this is the private sector's responsibility."

"One smart, but quiet guy in the class spoke up and said, 'the 'they' we're talking about? That's us!' That got to me – and it made me think. I started to think about developing electric vehicles back then, as a solution to this problem."

## On the Copper Rotor Induction Motor Website:

"The value of the Copper Rotor Induction Motor website is that it can become a catalyst for idea-sharing. It will give people the broader aspects of information to get them interested in how copper motor technology is developed. This is important. It's important for people to understand the difference between the induction motor and the permanent magnet motor. This subject needs to be broad to engage people – to get them thinking about new ideas, new approaches, and developing new technologies to improve our lives."

## Read More by or about Wally Rippel

### Sr. Scientist, AC Propulsion

"*Cambridge or Bust; Pasadena or Bust,*" Caltech Engineering and Science.

<http://calteches.library.caltech.edu/276/1/bust.pdf>

"*Induction Versus DC Brushless Motors,*" Tesla Motors Enthusiasts Blog.

<http://www.teslamotors.com/blog/induction-versus-dc-brushless-motors>

"*Why Electric Vehicles?*" AEV Co Motors - The All Electric Vehicles Company.

[http://www.aevcomotors.com/index.php?main\\_page=document\\_general\\_info&cPath=14&products\\_id=33](http://www.aevcomotors.com/index.php?main_page=document_general_info&cPath=14&products_id=33)