

Andy Randolph: Making Horsepower

Andy Randolph never planned on a career in NASCAR. He earned a Ph.D. in chemical engineering from Northwestern University

studying combustion and went to work for General Motors. One day, he was asked to help a GM Racing intern study combustion in Chevrolet Grand National engines at McLaren and realized that his expertise in understanding not just *how* engines work, but the details of *why* could help teams win

races. He got his start in motorsports spending his vacations in North Carolina volunteering with race teams, and moved full-time into racing in 1999.

Power is the rate at which an engine produces energy. NASCAR engines rotate about 9,000 revolutions per minute (rpm), which means that they are producing energy must faster than your passenger car engine, which generally runs around 2,500–3,000 rpm. A NASCAR Chevy Impala engine makes about 850 hp compared to the street version, which generates 303 hp. For comparison, 850 hp is the same power as that produced by 643 100-watt light bulbs.

As Engine Technical Director at Earnhardt Childress Racing, the joint engine program of Dale Earnhardt, Inc. and Richard Childress Racing, Andy's job is getting as much horsepower out of their engines as possible.



Statistics

NAME: Dr. Andrew Randolph

POSITION: Engine Technical Director, Earnhardt Childress Racing

FAMILY: Wife, four children, one grandson

EDUCATION: Bachelor's degree (Chemical Engineering), The University of Texas at Austin, 1981; Masters degree (Chemical Engineering), Northwestern University, 1983; Ph.D. (Chemical Engineering), Northwestern University, 1985

EMPLOYMENT: Worked for DuPont as a chemical engineer before going to graduate school; after earning his PhD, worked for General Motors in advanced engine development; consulted with Robert Yates Racing; full-time positions at Robert Yates Racing, Hendrick Motorsports, and Bill Davis Racing prior to moving to Earnhardt Childress Racing.

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On The Job

Q: What do you do at Earnhardt Childress Racing? A: I am responsible for performance development and all aspects of future engine development for the Cup, Nationwide and Truck series. That means that if you see me at the track, I'll probably be pacing nervously near one of our cars. We do a lot of research and development. Normally we'll take engines with promising new features from the development shop, race them on a limited basis at a couple of events, and then turn over the recipe to Rick Mann (Chief Engine Builder at ECR) to implement across the board.

Q: Where do you use math and science in your job? A: (laughs) Just about everywhere. My whole job is taking input from drivers and crew chiefs and turning it into mathematical science. That's what I'm here to do. Being able to translate from qualitative input to quantitative action is what differentiates successful programs from less successful programs.

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About Andy

One course I didn't take in school that I wish I would have taken is... Psychology. So much of success or failure is based on relationships and understanding different people's personalities, especially how they react when things get controversial or stressful.

My favorite part of my job is... Winning. Racing is a highly competitive activity. It's for competitive people. Winning doesn't necessarily just mean winning the race on Sunday, it means coming up with some kind of innovation that increases power or reliability. Every day is trying to win in one way or another.



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My least favorite part of my job is... My least favorite part is when things don't work the way you think they ought to work. I'm a competitive person. I don't like to lose.

The most challenging part of my job is... separating fact from emotion. When a team isn't running well, you have to separate out what they're telling you that's really

true and what is colored by their feelings at the time and what's happening on the track.

When I'm not working, I like to... Work on cars. I have a Lotus (shown above) that I road race at places like Little Talladega.

If I didn't work in motorsports, I would... Probably do something involving eyes or ears. Maybe a doctor, or maybe a researcher. Eyes and ears are very complicated, but they're very important.

The best advice for a student who wants to work in motorsports is... There's a lot of technical things going on behind the driver and the pit crew that you don't see on television. There's multiple opportunities for engineering innovation, leadership, and science. If you're interested in this kind of field, learn more about the opportunities and find out what part of it you like doing. Then go for it!

Getting There

Q: Did you like math and science when you were in school? A: Yes. (laughs) I was a go-kart racer when I was a kid and I loved to tinker.

Q: What about cars? A: I've always liked cars. I used to go through car catalogs when I was young and figure out what options I wanted on the cars.

Q: Is there someone in your life who served as a role model? When I first went to work at General Motors, my boss was a fellow named Ron Herrin. He intimidated the heck out of me when I interviewed. Instead of sitting across the desk from me, he got up and brought his chair so that we were sitting on the same side of the desk, facing each other. That simple thing broke down all the barriers. He was my supervisor for my first five years at GM and all our interactions were like that. No games, it was all about the science and what we were doing. I really appreciate people who are honest and straightforward.