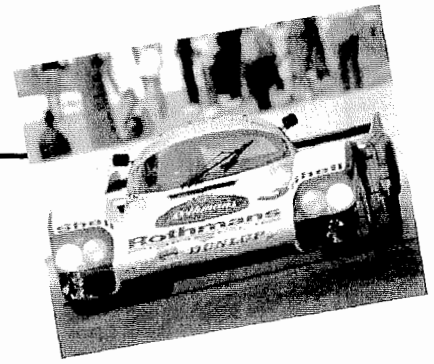


# SPOTLIGHT ON:

## Shot Peening and the NASCAR Industry



### America's love affair with NASCAR

NASCAR (National Association of Stock Car Auto Racing) was incorporated in February, 1948. The first races were on the famed Daytona Beach road course in 1949. And so began America's fascination with the sport that embraces our love of cars, dangerous speeds, and colorful, legendary drivers. Peter Golenbock in *"The Last Lap"* writes:

American stock car racing has never been just a sport to the motorheads and car nuts and racing fans and small-town gas jockeys and big-city executives of oil, auto supply, and car-related companies who have made it their passion over the years. It long has been a mania, a religion even, whose origins began in the Southeast and over the years has spread throughout this nation, to the point that the popularity of stock car racing has skyrocketed. No sport, not baseball or football or basketball, has a larger following. NASCAR has grown so dramatically that today Winston Cup events have become the biggest shows of any sport in whatever state they appear. The NASCAR race in Indianapolis, with 250,000 fans in attendance, has become one of the largest sporting events in the world.

NASCAR is also BIG money. Top drivers can become multi-millionaires. Corporate sponsors as diverse as Coca-Cola, Miller Beer, Kodak, Kellogg, McDonald's, Nabisco, UPS and VISA spend millions of dollars putting their advertising on cars.

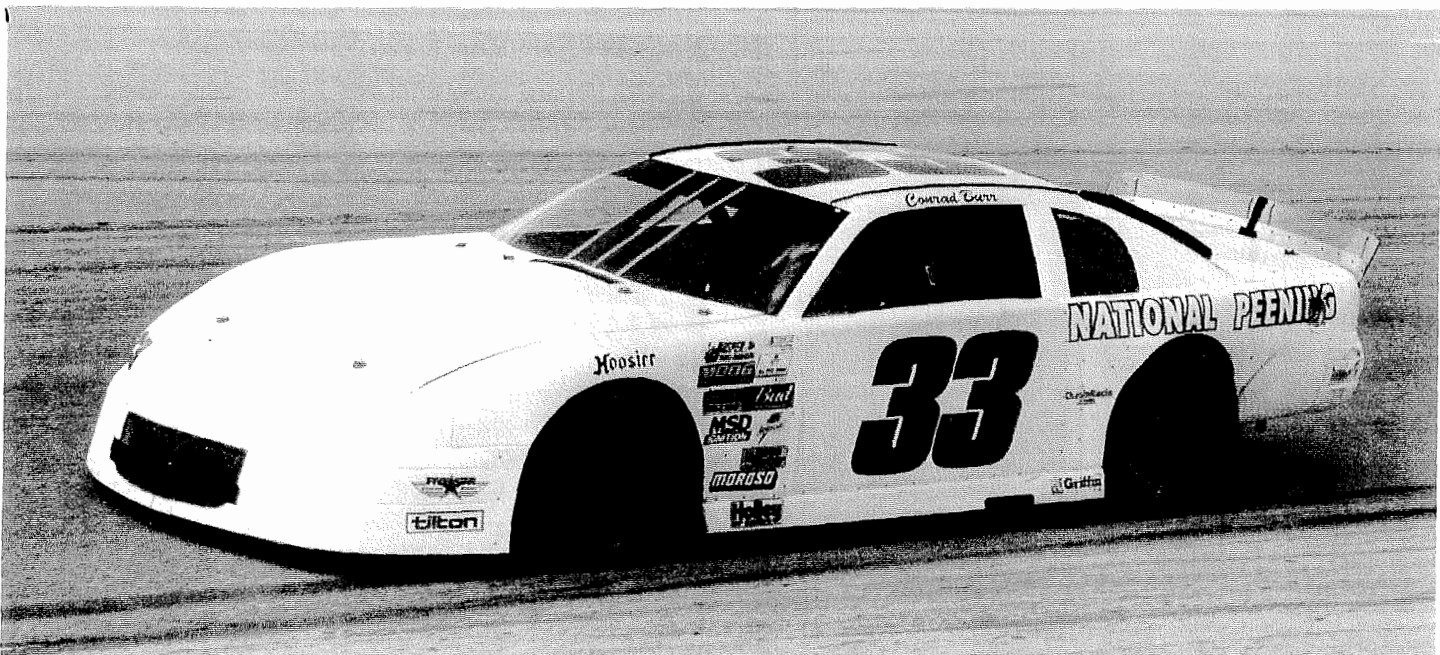
The cars cost over \$100,000 and countless manufacturers and suppliers vie for NASCAR business. Today's stock cars reach speeds of 200 mph. Victory is measured in seconds and there is absolutely no room for product failure. When there is no room for product failure, there has got to be shot peening...

### Meet the guru of shot peening and NASCAR

Shot peening stock car engine and suspension components makes so much sense, it's hard to believe that it wasn't always common practice. It took the vision of people like Jim Burr to bring the two together.

Jim is the sales manager for the National Peening facility in Statesville, North Carolina. North Carolina is in the heart of the NASCAR industry. Jim's son, Conrad, began racing 18 years ago when he was only 13. Jim knew the value of shot peening to the automotive industry from his years of working with clients like General Motors. He looked at the components that were failing on competitors' cars and began to shot peen the engine and suspension parts of his son's cars. Jim says, "People were always asking us why we never seemed to have engine failures or breaking parts. We would tell them that we shot peened our parts but our answer seemed to run off their backs."

Then the big race teams started shot peening—Jim believes that research from the aerospace industry finally proved the value of shot peening. Jim says that National Peening now shot peens tens of thousands of connecting rods a year for OEMs and the aftermarket that supplies the race teams.



Conrad Burr's stock car

Since shot peening is used primarily to eliminate fatigue failure due to cyclic loading, there are many components used in all touring divisions of NASCAR which can benefit from the shot peening process, if properly processed. Connecting rods, valve springs, wrist pins, crankshafts, retainers, and even rod bolts, are all engine components which experience cyclic loading or stress, making them candidates for the controlled shot peening process.

Shot peening can benefit other high-stress components of the race car chassis and thereby eliminate on-track failures that have become so costly to the race teams, based on the present point fund payoffs as structured today.

Wheels, spindles, control arms, differential gears, transmission gears, u-joints, drive shafts, and steering components all realize extended life from properly processed shot peening.

All components of the race car and its engine are becoming increasingly stressed due to attempts to eliminate weight. Racers of the future will become more dependent on shot peening if they are to become successful and stay successful in the very competitive world of auto racing.

#### **NASCAR, shot peening and the Internet**

If you need further proof that shot peening is important to NASCAR, go to the internet. "NASCAR and shot peening" brought up 12 matches at Yahoo. Some tidbits we found when surfing the web:

- Preston Marshall, in an article on what to look for when researching springs, writes:  
...Some things to find out when inquiring about springs are:
  4. Are the springs **shot-peened** AFTER winding? As, most engine-savvy people know, this is done to rod beams to increase the compressive stress at the surface of the metal. Well, the same is true for springs. **Shot-peening** is also one of those procedures that is done more often improperly than properly, so make sure to stay with a reputable manufacturer or an aircraft peening operation if you try to have this done yourself.
- Jesel, a manufacturer of shaft rocker arm systems, roller lifter systems and camshaft belt drivers for stock cars, promotes **shot peening** in their data sheet for block shafts.
- Carroll Smith wrote an article called "Indiana Blues" on the Hyperco suspension coil springs. It originally ran in *RACECAR* magazine. In the article Smith writes:  
Both the fatigue life and the maximum load that a spring can support can be increased by inducing residual stresses within the material by carefully "presetting" the spring. The fatigue life of virtually any metal component can be increased notably by **shot-peening** (not to be confused with bead or sandblasting). All Hypercoils are pre-set and

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National Peening states in their web site:

Let's Look at the Numbers...  
Specific Product Improvements\*

- Spring life increased 400% to 1000%
- Gear life increased 500%
- Drive pinion life increased 40% to 414%
- Steering knuckle life increased up to 121%
- Crankshaft life increased 100% to 1000%

\*Product improvements proven by independent sources.  
([www.nationalpeening.com/benefits/shtml#benefits](http://www.nationalpeening.com/benefits/shtml#benefits))

Numbers like these should convince everyone to follow Jim's lead and add shot peening to their formula for success.

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**shot-peened.** Plating metal components often leads to hydrogen embrittlement and subsequent fatigue failure. Hypercoils are powder-coated with a distinctive, abrasion and chip resistant finish that does not affect the performance or life of the spring.

Hyperco springs with a wire diameter of 0.625 in. (16mm) or less are cold-wound from pre-heat treated SAE 9254 chrome-silicon wire. Optimum wire diameter for the individual design is selected from the largest inventory of wire diameters in the industry. After coiling, the closed ends are ground, and the spring thermally stress relieved, pre-set and **shot-peened.** Completed springs are magnaflux inspected,

powder-coated and checked for dimensions, trueness and rate.

...Springs of wire diameter greater than 0.625 in. (i.e. NASCAR's prescribed 5.5 in/140mm diameter springs) are hot wound from SAE 5160 chrome vanadium wire. The wire for these springs is centerless ground, both to remove surface imperfections and to arrive at the optimum wire diameter for the specific design. After coiling, they are quenched and tempered immediately (to avoid the creation of a decarburized layer), stress-relieved, **shot-peened,** and inspected. Hyperco hot-coiled springs are guaranteed to be within +/-2% in rate.

- For one of the most comprehensive sites on NASCAR, visit [NASCAR.com](http://NASCAR.com).

To talk to the guru of shot peening and NASCAR, call Jim Burr at (704)872-0113. And if you've never seen a NASCAR race, watch one on TV or attend the real thing—as a professional in the shot peening industry, you can take pride in contributing to one of the most dynamic and popular sports in history. ○

**Editor's Note:** A big thank you to Jim Burr. His knowledge and expertise made a tremendous contribution to this article.