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New SFI Funny Car chassis spec is the product of a combined effort of experts

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Since its inception in 1951, the National Hot Rod Association has worked hand in hand with race teams, manufacturers, the SFI Foundation, and other outside parties with the shared goal of enhancing race car safety. The most recent such effort, which produced a new SFI 10.5 chassis specification for nitro Funny Car construction, is the final product of a process that included more than nine months of testing, research, and data analysis. The new specification, which was finalized Jan. 18, 2008, is the result of a cooperative effort that included nearly 30 individuals who are recognized experts in their chosen fields, including chassis builders, drag racing crew chiefs, metallurgists, aerospace engineers, and members of the NHRA Technical Services Department.

The Funny Car spec was developed with the assistance of the SFI-appointed Chassis Committee, which is composed of builders Murf McKinney, Ty Baumgartner, Mats Erickson, Brad Hadman, and Chuck Lett; Funny Car crew chiefs John Medlen and Austin Coil; NHRA Director of Top Fuel & Funny Car Racing Dan Olson; NHRA National Tech Director Danny Gracia; and outside technical consultants Niranjn Singh, Dan Davis, and Pat DiMarco of the Ford Motor Company; Wyatt Swain of Lincoln Electric; and professional engineers Roger Goode, Gerry LaRue, and Dan Metz. In addition, 11 members of the Society of Manufacturing Engineers, all of whom possess impressive credentials in the field of engineering, participated in numerous conference calls and provided valuable technical assistance to the project.

According to Arnie Kuhns, president and chief executive officer of the SFI Foundation, which oversaw the project, development of the Funny Car spec was aided by the resources available for the project and the open lines of communication that were maintained between all parties.

"When we developed this spec, we were fortunate to be able to have computers, simulators, and other equipment at our disposal, and that went a long way towards modernizing the process," said Kuhns. "More importantly, we had some of the most talented and intelligent individuals who I've ever met working on this project. The engineers at Ford Motor Company and John Force Racing were especially helpful. The amount of resources they had at their disposal was incredible. Everyone who was involved in this project was willing to work seven days a week in order to get this done. It was a total team effort."

Work on the project began last April, shortly after the tragic testing accident that claimed the life of Funny Car star Eric Medlen. In several conference calls, NHRA officials and members of the SFI Foundation agreed to develop a new guideline for Funny Car chassis construction. The spec ultimately includes thicker tubing in critical stress areas and the option of a three-framerail design. Working closely with the Force team and engineers from the Ford Motor Company, the panelists also agreed to run a finite element analysis model on the existing chassis design in order to gain a baseline for future improvements. A finite element analysis (FEA) is a



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computer simulation technique that is often used in engineering. It uses a numerical technique called the finite element method. In layman's terms, an FEA on a Funny Car chassis would allow engineers to accurately simulate the stress endured by the vehicle on the racetrack.

As Olson explained, those involved in the project had other valuable tools at their disposal, a shaker rig for modal testing, and a twist rig for static stiffness testing, two devices that were built to duplicate and measure the various stresses and strains placed on a chassis during a run.

"During the project, we built a car, and we were able to attach it to these rigs, which are huge multimillion dollar machines that literally twist the car," said Olson. "They are very sophisticated machines that are able to duplicate the harmonics, the vibrations, and the strains that are placed on the car as it goes down the track. The amount of information we gained from those tests gave us a lot of insight into what needed to be done in order to enhance safety in these cars."



The Force team, led by crew chief John Medlen and Ford engineer Singh, developed its new chassis following extensive use of FEA technology and the twist fixture. As the name suggests, the twist fixture twists and bends the chassis while more than 300 different gauges measure stress, helping to identify critical areas. The team then made extensive use of FEA analysis in order to confirm the results of the stress tests. Numbers indicate that the new chassis is several hundred percent stronger than last year's cars.

"The cross sections where Eric's car failed and where John Force's car failed last year in Dallas were subject to 35,000psi in those areas," said Medlen. "New cars are under 10,000psi, and in most tests, they're under 5,000."

The data gained from the FEA, the four-post tests, as well as numerous other tests and experiments, was channeled through the NHRA Technical Services Department and shared with each of the various entities involved in the project. Additional conference calls and meetings were scheduled in an effort for all parties to reach a consensus. After each test, new information emerged, and NHRA, along with the other individuals involved in the project, was able to discuss and disseminate that information in order to determine the best course of action.

"As this process was ongoing, the key was good communication," said Olson. "All of the manufacturers were kept in the loop from day one, and anyone who wanted to call NHRA was provided with an update. As far as the exchange of information, we held nothing back."

The finalized new spec, dubbed SFI 10.5, pertains to new Funny Car chassis and features numerous changes over the old design, including thicker-walled tubing and additional braces in critical stress areas. The panel also came up with several modifications to the previous spec, 10.1E, that applies to current Funny Car entries.

On Jan. 11, a draft of the new spec was sent to the committee for review and subsequently approved. A week later, the final spec was approved by the SFI Board of Directors, and a day later it was released to the general public.

"The implementation of the Funny Car chassis spec is just one of many projects that the NHRA Tech Department is heavily involved in," said Olson. "We are continually gathering and evaluating data and communicating with race teams, manufacturers, the SFI, and other entities in order to keep the sport of NHRA POWERade Drag Racing moving forward."



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