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PIV Analysis Comparing Aerodynamic Downforce Devices on Race Car in Water Tunnel SAM HELLMAN, PETER TKACIK, MESBAH UDDIN, SCOTT KELLY, University of North Carolina at Charlotte — There have been claims that the rear wing on the NASCAR Car of Tomorrow (COT) race car causes lift in the condition where the car spins during a crash and is traveling backwards down the track at a high rate of speed. When enough lift is generated, the race car can lose control and even fly off of the track surface completely. To address this concern, a new rear spoiler was designed by NASCAR to replace the wing and prevent this dangerous condition. Flow characteristics of both the rear wing and the new spoiler are qualitatively analyzed using particle image velocimetry (PIV). The experiment is done in a continuous flow water tunnel using a simplified 10% scale model COT. Flow structures are identified and compared for both the wing and spoiler. The same conditions are also reviewed when the car is traveling backwards as it might during a crash. The cause of the lift generated by the rear wing when in reverse is shown.

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