

## 24 Hours of Lemons Race Background

24 hours of Lemons is a 24-hour endurance race to see which car will be the last one standing. The car that completes the most laps is ultimately the winner. Each team will need to purchase a vehicle for \$500 or less, including any performance modifications added to the vehicle. The team must also complete their project following the extensive list of 24 Hours of Lemons technical rules. We will be working on a 2008 Ford Fusion to complete our project. This will be a year long project and all tasks and requirements will be assigned weekly. If we were to compete in the 24 Hours of Lemons race, our car would need to pass a technical inspection. If everything looks good in our vehicle and follows the rules and regulations of the race then we would be able to participate. If anything were missing from the technical inspection list it would prevent us from racing.

## Project Goal

The main objective of our project is to get our vehicle race - ready in hopes to compete in a race at the end of the school year. We will do this by following the rules and regulations set by the 24 hours of Lemons website.

## Roll Cage Design

Our roll cage was designed on Solidworks in the Fall 2021 semester and it was constructed and installed in the Spring 2022 semester. According to the 24 hours of Lemons rulebook, the roll cage for our vehicle must be professionally made and installed by a manufacturer. A roll cage that is poorly built, or mounted improperly would disqualify us from competing in the race.

The roll cage must include:

- a full front and rear hoop, appropriately braced to each other along the roofline
- two driver-side door bars, appropriate main-hoop backstays with no bends, located as close to 45 degrees from horizontal as practical
- one main-hoop diagonal
- appropriate spreader plates and gussets
- complete 360-degree welds at all joints, including all car-to-cage joints.

Other specifications are as follows:

- each major load bearing member must be formed from a single continuous tube
- all sides of all of inches inside the area enclosed by the cage
- grade, and quality tubing; no stretched or crushed bends allowed; DOM mild steel is very strongly recommended over ERW (seamed) tubing
- all spreader plates must be mild steel, at least 24 square inches

for roll bar padding, all roll cage tubing must be padded with high-density roll bar padding wherever a driver may come in contact with the tube head, knees, elbows, etc.



## Roll Cage Simulation

The roll cage was designed by one of our team members to test how the roll cage could withstand possible impacts that may occur during a race. We ran a simulation on Solidworks that showed the torque, stress and tension applied.

According to the figure on the right, the roll cage would be able to handle the impacts that we tested on it. Now that our roll cage has been manufactured and installed in our vehicle, we will be able to mildly test it before the event of a race.



## Car Interior

When we purchased our vehicle the interior of the car was dirty and had a funky smell. We had a checklist of things that had to be removed, so we completed the following removals:

- floor carpeting
- ceiling carpeting
- all seats
- windows that did not roll down



**Team Members:** Jack Dallas, Ana Garcia, Daniel Guilbeaux, Daisy Hernandez, Tim Ingram, Bailey Pray, Madison Taggart

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