

SENIOR DESIGN PROJECT: BAJA 4WD ABSTRACT

This group project was to design a four-wheel drive system for the Baja SAE team at Tennessee Tech, as the team will be required to use a four-wheel drive system in the 2021-2022 competition year. To accomplish this, our team met with Jeff Webster and the Baja SAE team to get the specifications of the Baja car they have previously used. Since the previous cars were two-wheel drive, our team had to research four-wheel drive systems and come to a decision on the type of differential we wanted, the design of the transfer case, and what materials we would use so that it would not affect the performance of the Baja car significantly. After making these decisions, the team split up into groups and started working on the designs and models for each of the parts and the overall system. Throughout this process the team ran into different problems, like deciding on the type of differentials we wanted to use, or how we could manipulate the frame of the Baja to still be regulation but include the new four-wheel drive system.

The project turned out to be a success, and the team was able to create a four-wheel drive system that would work with the Baja car, and should not reduce the performance of the car itself significantly. The team ended up going with a Viscous Limited Slip Differential and a personally designed transfer case, but we did have to modify the actual car frame so that the new system would work properly. This means the Baja team would have to modify the frame to fit the system, but make sure the frame stays within regulations. We learned about the different types of differentials and how each of them works along with how a four-wheel drive system works; but the hard part was creating a system that would not affect the performance of the Baja car significantly. The approach we followed allows the Baja team to make changes as they see fit, but it keeps the same general idea.