

Pedal Assembly Test Plan

ME 498 - Spring 2021

Latest Revision: 05/19/2020

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INTRODUCTION

The main goal of the Pedal Assembly is to let the driver control the acceleration and braking of the car. Each pedal must be easily reached by 95% of the people on the team, and will include an accelerator pedal, brake pedal, and dead pedal.

TESTING

THROTTLE PEDAL

There are a few different things that must be tested about the throttle cable. The first is that once released, the pedal must be able to return to its original position without sending an input to accelerate. The pedal must also be able to stop when pushed all the way down, without the potentiometers reaching their maximum depression.

BRAKE OVER-TRAVEL SWITCH

The BOT switch has several functions that must be tested. First thing to do is test that once pressed, the BOT switch cuts off all power to every system, without the ability to be turned back on before resetting the switch. It also must be tested that the BOT switch will not be crushed after activation. Both of these functions can be tested by disconnecting the Master Cylinders, and quickly depressing the brake pedal as far as it can go. In order to pass the BOT switch must not be harmed, and all systems must be shut off entirely.

BRAKE PEDAL TO WITHSTAND 2000N OF FORCE

This is a very simple, yet very important rule. This can easily be tested by attaching a load sensor to the pedal while having someone press down hard on the pedal until a force of 2000N can be read on the load sensor. This force should then be held so that all components may be checked for forced deformation.

BRAKE LOCK

The last, but definitely not least important rule which needs to be tested, is the brake lock. This rule maintains that the driver must be able to lock all four wheels when braking while under speed. This can be determined by using measurements to determine how much force the brakes are able to output, and comparing that to the clamping force which will be needed to stop the car. The force which the brakes output can be measured by first measuring the exact distance which the brake pedal is able to move the brake pads, this can then be manipulated to find out the force the brake pad would exert if it were trying to be pushed that distance out. This can then be compared to the braking force needed by using a specified velocity, and the weight of the car to determine whether the wheels would be able to be locked when the driver is applying the maximum force possible to the brake pedal