**Risk Assessment**

**Safety Plan**

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| Project information: | | | | | | |
| Team 504: The Examination of Occupant and Vehicle Responses to Low Speed Rear-End Crashes | | | | |  | 02/28/2019 |
| Name of Project | | | | |  | Date of submission |
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| I. Project description: | | | | | | |
| Focus on the development of a general empirically based method of calculating impact velocities based on minimal damage. This | | | | | | |
| involves conducting live crash tests on a closed circuit and analyzing the data to find resultant trends of the car and occupant; the | | | | | | |
| forces of impact, bumper deformation, and occupant movement will be the major components that we will analyze through | | | | | | |
| experimentation. This involves a car in motion colliding with a stationary vehicle with an occupant inside the moving vehicle. From | | | | | | |
| the test, sensors will be placed on the car and occupant so their respective movement can be tracked throughout the process. | | | | | | |
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| II. Describe the steps for your project: | | | | | | |
| The project will require testing of the bumpers in live crash tests at velocities less than 7 miles per hour. This means the bumpers | | | | | | |
| will have to replaced and the new bumpers mounted each trial. Then the two vehicles will be set apart by a specified distance and | | | | | | |
| then driven up to speed to reach 7 miles per hour and then come to a collision with the stationary car with the test bumper. | | | | | | |
| Through this process, sensors will be mounted on the car and occupant to obtain the data previously mentioned from the trials. | | | | | | |
| Once testing is completed, the results will be analyzed in a dynamic modeling software so the group can find trends in low speed | | | | | | |
| data. | | | | | | |
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| III. Given that many accidents result from an unexpected reaction or event, go back through the steps of the project and imagine what could go wrong to make what seems to be a safe and well-regulated process turn into one that could result in an accident. | | | | | | |
| During the test there are some minor accidents that can occur like flying debris from the roadway or the point of collision. For | | | | | | |
| extreme circumstances, there could be a malfunctioning in the car during testing that could cause the car to become unstable and | | | | | | |
| change direction/speed sporadically. For the occupant, there is a safety concern that he may experience minor to major neck pain | | | | | | |
| (whiplash). In the extreme case that the car becomes unstable, the occupant is now in jeopardy of serious injury due to potential | | | | | | |
| of a crash. Car problems could arise due to internal car troubles, such as overheating, tires exploding, or faulty breaks. | | | | | | |
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| IV. Perform online research to identify any accidents that have occurred using your materials, equipment or process. State how you could avoid having this hazardous situation arise in your project. | | | | | | |
| There have been cases of whiplash occurring at speeds lower than what we are testing at (5mph as opposed to 7mph). These | | | | | | |
| cases are usually prevalent in real world scenarios when two cars collide, so the testing conditions are different, such as our driver | | | | | | |
| being aware of the wreck which will soon occur. All our testing is to see if the occupant experiences similar neck pain after the | | | | | | |
| crash, we will take precautions to make sure no other damages are done like making sure the driver is aware of his surroundings | | | | | | |
| during testing. Similarly, there have been cases of crash tests where cars have become unstable and do not hit their target mark/ | | | | | | |
| do not follow proper ordinance. Although these tests primary go wrong at high speeds due to the instability of the car, the | | | | | | |
| experiment needs to be closely set up so if such situations arise, they will be managed with ease. | | | | | | |
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| V. For each identified hazard or “what if” situation noted above, describe one or more measures that will be taken to mitigate the hazard. | | | | | | |
| In the case of flying debris from roadway: all subjects present during testing will wear safety goggles and ensure they are a good | | | | | | |
| safe distance from the testing zone in order to mitigate risk. In the case of vehicle malfunction: The occupant of the vehicle will be | | | | | | |
| wearing a safety belt to prevent any major injuries caused by crash. Personnel present during testing will ensure they are a good | | | | | | |
| safe distance from the testing area, in order to avoid accidental injuries. First aid materials will be kept on hand to ensure there is | | | | | | |
| Material necessary for immediate treatment of major injuries or on the spot treatment of minor injuries. If testing is to begin and | | | | | | |
| all of the above stated items are not present at the scene, the testing will be halted until the necessary items are obtained. | | | | | | |
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| **VI. Rewrite the project steps to include all safety measures taken for each step or combination of steps.** | | | | | | |
| |  | | --- | | Before the start of every test, the cars will be inspected to ensure the regular and safe operation of the vehicle during each test. | | This way it reduces the possibility of any danger to the occupants in either car and the spectators viewing at a distance. | | Then we will begin the testing of the bumpers in live crash tests at velocities less than 7 miles per hour. The occupants in both | | vehicles will always be required to wear seatbelts and safety glasses while the crash test is being conducted. This means the | | bumpers will have to be replaced and the new bumpers mounted each trial. Then the two vehicles will be set apart by a specified | | distance and then driven up to speed to reach 7 miles per hour and then come to a collision with the stationary car with the test | | bumper. All spectators to the crash will have to stand at least 15 – 20 feet away from the intended crash point to ensure safety from | | flying debris. The spectators will also be required to wear safety goggles while the crash test is being performed to also avoid any | | debris that is kicked up from the vehicles as they reach speed. Through this process, sensors will be mounted on the car and | | occupant to obtain the data previously mentioned from the trials. Once testing is completed, the results will be analyzed in a | | dynamic modeling software so the group can find trends in low speed data. | | | | | | | |
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| **VII. Thinking about the accidents that have occurred or that you have identified as a risk, describe emergency response procedures to use.** | | | | | | |
| If any minor accidents or injuries (those which do not require professional medical attention) occur, we will immediately inform all | | | | | | |
| those in charge and treat injuries as necessary. If there is any need for minor medical attention or assistance, those injured will be | | | | | | |
| tended to immediately to prevent any future accidents from happening. For any major accidents or injuries, professional medical | | | | | | |
| personnel will be notified immediately (call 911) and all necessary personnel will be notified. Until emergency aid arrive, group | | | | | | |
| members and all parties available with keep the individual(s) under control and act as first responders to help with any immediate | | | | | | |
| issues. All experimentation will cease until the individual(s) is well and the testing conditions have been monitored to prevent the | | | | | | |
| issue from happening again. | | | | | | |
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| VIII. List emergency response contact information: | | | | | | |
| * Call 911 for injuries, fires or other emergency situations * Call your department representative to report a facility concern | | | | | | |
| Name - Relation |  | Phone Number |  | Faculty or other COE emergency contact |  | Phone Number |
| Jeremy Cummings - Overseer |  | (850)-228-3335 |  | Dr. Shayne McConomy |  | (850)-410-6624 |
| Kenneth Goldsby - Family |  | (850)-264-5260 |  | Dr. Jonathan Clark |  | (850)-410-6608 |
| Samuel Pyle - Friend |  | (850)-698-5638 |  |  |  |  |
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| IX. Safety review signatures | | | | | | |
| * Faculty Review update (required for project changes and as specified by faculty mentor) * Updated safety reviews should occur for the following reasons:  1. Faculty requires second review by this date: 2. Faculty requires discussion and possibly a new safety review BEFORE proceeding with step(s) 3. An accident or unexpected event has occurred (these must be reported to the faculty, who will decide if a new safety review should be performed. 4. Changes have been made to the project. | | | | | | |
| Team Member |  | Date |  | Faculty mentor |  | Date |
| William Abraira |  | 02/28/2019 |  |  |  |  |
| Joseph Godio |  | 02/28/2019 |  |  |  |  |
| Vincent Grimes |  | 02/28/2019 |  |  |  |  |
| Robert Montuoro |  | 02/28/2019 |  |  |  |  |
| Michael Small |  | 02/28/2019 |  |  |  |  |
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**Report all accidents and near misses to faculty mentor.**