

Risk Assessment Safety Plan

I. Project information:

Electric Vehicle Range Extension		1/20/17
Name of Project		Date of submission
Team Member	Phone Number	e-mail
Seth Rejda	850-712-9304	Slr13b@my.fsu.edu
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Luke Marshall	941-661-0083	Lsm13b@my.fsu.edu
Khaled Farhat	850-591-6646	Kf14d@my.fsu.edu
Taofeek Akintola	850-980-0794	Taofeek1.Akintola@fam.u.edu
Faculty mentor	Phone Number	e-mail
Chiang Shih	850-410-6321	Shih@eng.famu.fsu.edu

II. Project description:

The first project is a continuation of the 2016 project to demonstrate the capabilities of next generation battery technologies in vehicle drive systems. The 48 volt Tomberlin LSV electric vehicle currently resides at FSU and can be used as a platform for the new group of students. The main goal will be to improve overall range of the vehicle in its current form. Performance objectives for this project would include documentation of the current performance and range, upgrading onboard electronics for robustness, adding non-traditional power adders (solar panels, regenerative braking, etc) and any additional advances the team decides is feasible while documenting incremental changes in performance and range for each component.

II. Describe steps from project initiation to completion:

1. Conduct extensive background research on non-traditional power adders for electric vehicles.
2. Assess current condition of the vehicle.
3. Repair any necessary electronics/components for benchmark testing.
4. Perform benchmark testing to evaluate performance and set a standard for our overall goal.
5. Procure necessary components for the vehicle such as a solar panel system and electrical components.
6. Install solar panel and electrical components for further testing.
7. Perform final testing of vehicle and document the performance and range increase.

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. (See examples)

1. While assessing the current condition of the electric vehicle, one could be placed in danger of electric shock or possible fire.
2. While repairing any necessary electrical components, again electrical safety is an issue and shocks could occur.
3. While testing the vehicle, any person could be hurt by falling off of the vehicle, being in a crash, or being hit by the vehicle.
4. While installing the necessary components, one could be injured again through electrical shock, lifting heavy objects, or using tools.
5. While performing final testing, all team members are again at risk of injury, as stated above in (3).

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.

Electrical shock and fires are a regular occurrence while working with high voltage and amperage. These injuries could be avoided by ensuring that electricity is not flowing while work is being done on the circuitry. Proper equipment to test the safe flow of electricity should also be used. When installing components, several members should be on hand to assist with any heavy lifting or use of unsafe tools or machinery. When testing of the cart is being conducted, all members should maintain situational awareness and drive/operate the vehicle safely. Less-traveled roads should be used to mitigate the interaction with any traffic or pedestrians. Also, all driving laws and safety regulations should be followed.

V. For each identified hazard or “what if” situation noted above, describe one or more measures that will be taken to mitigate the hazard. (See examples of engineering controls, administrative controls, special work practices and PPE).

For electrical safety, voltmeters and electrical shut-offs will be used to mitigate the hazard of electrical shock. When operating the generator at any time, the vehicle will be outside due to the burning of propane gas. When heavy lifting, tooling, or machinery is to be used, proper safety measures will be taken and multiple team members will be on hand to ensure this. While testing the vehicle, all road laws will be followed and all members will be constantly attentive to avoid and possible hazards.

VI. Rewrite the project steps to include all safety measures taken for each step or combination of steps. Be specific (don't just state “be careful”).

1. When assessing the vehicle condition, or operating on the circuitry of the vehicle, the team will make sure that the flow of electricity is cut-off and that the correct amount of flow is never surpassed to cause an electrical fire.
2. When conducting any testing of the vehicle, all members will be mindful of their surroundings, while operating under all road safety laws. All testing including the generator will be performed outdoors and away from open flames.
3. When installing any heavy components such as the solar panel, multiple team members will be present to ensure that no injuries occur. The same goes for any electrical components that are being installed or when any machinery is being used.

VII. Thinking about the accidents that have occurred or that you have identified as a risk, describe emergency response procedures to use.

Immediate emergency response procedures include electrical shut-off if someone is being electrocuted or proper care of burns if any have occurred. If any serious electrical shock has occurred, 911 will be called. While lifting heavy objects, team members will ensure that everyone is ok and can apply simple first aid if needed, otherwise 911 can be called for serious injuries. If any fire occurs, the closest fire extinguisher will be used to put out the fire. If an injury occurs while testing the vehicle, the person will be evaluated for seriousness and the proper first aid or medical care will be called or provided.

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	Phone Number	Faculty or other COE emergency contact	Phone Number
Hospital -Emergency	911	Chiang Shih	850-410-6321
_____	_____	_____	_____
_____	_____	_____	_____

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
Seth Rejda	1/20/17	Chiang Shih	1/20/17
Hafs Sakka	1/20/17	Chiang Shih	1/20/17
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Khaled Farhat	1/20/17	Chiang Shih	1/20/17
Taofeek Akintola	1/20/17	Chiang Shih	1/20/17
_____	_____	_____	_____

Report all accidents and near misses to faculty mentor.