

Ok, I will start it out :) - This is long

I like that there has been the initiative to approve and accept a place for the teams that want to "step out of the box" and push their students. Class 3 looks to be a great addition. My history of gas Supermileage remembers back to when at Stout, I was on the committee in 99 or 2000 to start up an "experimental class", which turned into the Concept Class. At the time there were only maybe 1-2 cars that wanted it and now it is pretty strong. Giving students the chance to "play" with new concepts that they might not have otherwise been allowed to do... (We have seen things like; hybrids, hydraulics, diesels, two cycle chain saws, fan cars, etc...)

1) My Concern: What is the point of Class 2 now? Class 1 is for new, first year cars. They can only run that car one year and it has to be tore down. Class 2 used to be considered the High Competition Class where teams would modify cars from year to year with no limits on spending. Now with a limit on spending, all high competition cars are going to be entered into Class 3, which in my eyes, takes AWAY from teams being able to play around and see how they compare to others playing around... instead they are going to see that they can never compare to a "High Competition Car" in their class... I for one will likely always run the no spending limit class as we have over \$1,500.00 in wheels alone! Over \$500 in chassis and soon a Carbon Fiber body... That does not even include motor/controller and batteries... I do not understand why class 2 was messed with. I suggest leaving class 2 alone completely and open up class 3 like you proposed allowing for the new batteries and dot rubber and stuff. If you want to take out regenerative braking and solar panels from class 2 - go for it. Put those in class 3 as they are items that can be above and beyond. PLEASE LEAVE CLASS 2 ALONE. Allow class 3 to be it's own baby and watch it grow! Trust me, it will grow into something that we all go "WOW" someday! (if you let it...)

2) Under "Body", #1, you added "measured at axle studs" for the 4ft width. So is this saying that I can have a body shell that is 5ft wide if it sticks outside of the axle studs? Or a frame that is 5 ft wide if it sticks outside of the axle studs? If not, I suggest saying "Measured at the widest point of the entire vehicle, with body attached" If you are truly allowing for a car larger than 4 ft wide, be ready to see a Toyota Prius some day on the track... It fits within Class 3

3) Speaking of sizes: Does Class 3 HAVE to follow the size requirements? It says "do not strictly comply with the rules of the competition." This means I could enter a toyota prius in class 3 and have it on the track with the other cars. Maybe have teams be required to submit a proposal of their class 3 entries for approval prior to any challenge day? Or say it MUST follow the size requirements of class 1 & 2.

4) Last Comment for now... under "Crash Protection", #5, you added "or battery boxes". I would say "and battery boxes." Otherwise it opens up for some school someday to say they decided to follow only crash protection in the battery boxes and not the driver's compartment because it says "or"...

Jesse Domer,

Ok, three more small comments...

1) Why is the maneuverability test not a requirement at each challenge? Gas requires a steering safety test in both directions to qualify to run to show that the cars can handle the turns on the tracks and that they will not "run off the track" or similar scenarios. The maneuverability part of Electric should handle this in that a car has to be able to turn within 5 cones 25 feet apart. This is not as hard as the gas test, but it is something. THOUGH it is not required. So you could literally be throwing a car on the track that has a 1,000 foot turning radius... The reply to this statement should not be "That is there problem if they did not engineer it to turn..." This is a safety concern for others on the track and pedestrians watching at that first turn with that car at 30mph... (not to mention if it does not have brakes as my third statement below)

2) With the Maneuverability/Steering. Suggestions, Make it mandatory in "BOTH" directions OR make it mandatory to run them in the same turning radius test gas cars do and allow maneuverability to be optional still...

The reason I say both directions is that is what gas does with their turning safety test, AND the reason why :) You will like this. Cars were adjusting their tie rods completely to one direction so they could turn sharp right and not turn at all left just to pass the test, then come race time, they re-adjust tie rods back to normal, which means they no longer pass turn test :) How do I know? (Back in 1998 when I was a HS Student, we did this to pass the test when it was one direction only :)

3) Why is there not a minimum stopping distance for electric cars? There needs to be something in place that a car should have to stop in a minimum of "x" amount of feet? Maybe same as gas. The whole "push" concept in the rules is a joke. Make it standardized... Why chance safety? The test area is already set up at RA and FVTC for this with Gas, just run the Electric cars through it as well... In reality it will be the easiest test for 99% of the electric cars if they are planning to compete in the braking contest, which is also not required still...

Jesse Domer

Good ideas Jesse, Thanks for taking the time to give us input!

This type of feedback is exactly what we are looking for. I could see opening up the spending limit of class 2. Nebraska (Power Drive) has an even higher limit for class 1 (\$3300-new this year). In my experience in Iowa, Class 1 and 2 (\$2500) cars would be just as efficient as a class 3(no spending limit). I think we should keep it in the Electrathon limitation (size, batteries, style, etc.) format however. Requiring the Maneuverability (both directions) and Braking (w/min. distance required) should also be put in the rules specifically.

Once again thanks for taking the time to review the rules and give suggestions!

I agree with Jesse on the class 2. When I read the rules I thought the same, why have it. I also agree that we should keep it the same as it is. If the board has decided that a third class is necessary, then open it up. However, I do not think the vehicles competing in the same class should be able to run different battery weights. This to me is apples and walnuts, really no way to compare the efficiency of the vehicles to each other. What I hear you say in the rules as written is; use dot rubber and then you can have more batteries. I am not sure we can compare a class three 24v system to a 48v system. Remember, we are just getting into the experimental 48v systems. We cannot really predict the future by looking at the vehicles of the past. Just look at the HMOV vehicles of the early 90's to the ones today, no comparison.

For me, the ultimate goal for my students is to be the "Grand Champion" the best all around vehicle in the state out of the two classes (now three) With that said I disagree with Jesse in the need to set a maximum braking and minimum steering rules. Remember the turning radius of the HMOV's was originally determined by the size of the cul-de-sac where they were qualified at Stout. There really is no basis other than that for that particular rule. I see no reason in creating more rules for these categories. Less is more.

Additionally, I would like to see the value of the vehicle increased for class one. Frankly, you really cannot get too much anymore for 2500. Has anyone see the price for steel lately? That alone is limiting what we can spend on wheels, brakes, and batteries. Please consider raising it to perhaps \$3000 (just a number I picked out of the air). Raising the price with inflation would help keep our kids equal. Just think, I bought my controller and e-tek for \$650 three years ago, now a non-programmable controller at www.cloudelectric.com is \$229.00 plus shipping and I cannot find an e-tek. The nearest acceptable motor is \$529.95 plus shipping. Together these two items equals \$758.95 30% of my allowable budget. Not much for allowance for any creativity or quality in the rest of my vehicle. Add onto this number some labor for the local machinist to work with my kids in making new spindles and we are now cutting stuff to save money. Please consider raising the limit.

Just my thoughts for now.

Damon

Damon,

I guess the one reason that sticks out in my mind about the minimum turning radius is at Fox Valley with their back 90 degree skinny turn. I know cars are already eating up tread on that curve every year pushing 25 mph through it. I am not sure I like this solution, but maybe at various tracks there is a turning radius safety check. Road America probably does not need it, where others do? Overall though, not sure it is a bad thing to put in place. I am betting we all will pass it anyways. Iowa on the other hand, they do not build their cars for maneuverability or braking! I saw a car there that took something like over 100-200 feet to stop! They had NO CARE about brakes. They were there for endurance and endurance alone! Good brakes were added weight to them... That's scary.

I am with you Damon in hoping all advisors are pushing their students for the "un-attainable" 3!!! My students and I often joke and brainstorm about how we can get ALL THREE first places with the same car! Under a million bucks :) It is our goal as well...

Jesse Domer, Watertown High School

www.GoslingElectric.com

In agreement in raising the cap and leaving class 2 alone, unless there is more discussions on the reasons to the changes to class 2.

Battery weight/DOT rubber. I believe advisors were asking for allowing more creativity. By allowing the students to try 48 volt (which is not experimental... golf carts have been using it for years) the increase in pack weight is a safety concern while using bicycle wheels. By requiring DOT rubber, I think the advisory team was allowing the teams the option of running higher voltages by removing a possible safety issue with the tires. Damon, the pack weight was obviously determined by solid engineering and physics calculations and not "pulled from the air". I'm sure Dave would be glad to go over those calculations with you. I think Dave did a great job in keeping with the spirit of the competition while opening up the possibilities to the students. It's not "apples to walnuts". (What's with all the food terms?) I believe Dave and the advisory team did a great job in making the field level in terms of capabilities. We'd hate to have a team out there being a "distraction". There is also a MAJOR cost savings in brakes, tire and rims when using the DOT type tires. In an age of shrinking budgets, I think some advisors/teams will be looking at this as a possibility.

Minimum Turning/Braking - let's turn it around. How would E.C. North feel if Watertown's car ran into them on the track and disabled their car because Watertown could not stop in time or make a turn around them? I find it a little funny... there was so much concern for safety about a certain car's weight, but now we want to remove a minimum safety requirement? All engineering design briefs list the design criteria. Why should the student's vehicles be different? There should be SOME type of minimum test.

Boy... E.C. North and Watertown are out to be champions...hopefully you guys won't run over the rest of us. See you on the track By the way... you guys better be bringing your "A" game. It's amazing how motivated a team gets after being called a "distraction". I love a little pre-race trash talking!

So.... when will the "official" rules be completed for this year?

I'm knocking on wood here with all this talk about crashing... :)

Side question: cost of vehicles

Does anyone use depreciation when figuring the cost of your class 1 vehicles? I know there is nothing in the regulations that says we cannot use depreciation...

Jesse Domer, Watertown High School

Shouldn't we try to be winners by good **design** and **engineering**, instead of manipulating numbers?

In regards to money (depreciation)

To appreciate where I am coming from in my thinking on the rules one should understand my thoughts on EV.

I believe the following:

EV is a great way to introduce high end problem solving and long term thought processes to students.

All teachers should embrace such projects for the learning that takes place.

Just to participate and bring a vehicle to the track means to win.

With rules "less is more" Let the kids, advisors, and community connections be creative.

Set the bar high and expect more, the kids will arise to your expectations.

Enjoy the competitions, all the hard work should be done once the vehicles are qualified.

and finally, share so others can learn. Duplication is the highest form of flattery.

More specifically, I like the direction Wisconsin Electrathon is going, 48v vehicles with DOT rubber are a hoot and really cool. They are not a distraction, nor are the vehicles from Michigan or Iowa. Secondly, I do not question that the battery pack weights are based on sound mathematics; I just want to be sure that in the long run we do not continually tweak the rules because someone is doing something we did not expect. A lot of foresight now will keep our rules clean in the future. More input and collaborative discussions will create better rules. Keep the personalities out of the discussions. Finally, I like you all, would not appreciate if someone came and did not have brakes nor could not steer. To solidify my point, I don't think we should have minimum distances on them. I think if they stop in a reasonable distance and are able to turn both ways they should be fine. For me, the ultimate goal of the competition is the grand champion award; my students cannot win it with a vehicle that stops in 100ft nor turns poorly. Perhaps we should all put our emphasis on this award then we do not have to create rules for the sake of future teams. No one I watched qualify over the last three years had poor brakes or poor steering, in fact all of the vehicles were very impressive. My heart goes out to the HVM vehicles that struggled with the braking requirement and ended up not qualifying. I often wondered how a distance of 50ft at 15mph was originally determined for them. Most of the HVM vehicles on the track are barely moving and would have no problem stopping in 10ft. While we all have a different standard as to what is reasonable, I think we would all say that a vehicle traveling at 15mph that stops in 100 ft is an unreasonable distance and a vehicle traveling at 15mph that stops in 26 ft or 30 ft is a reasonable distance. I would not like to see the rules changed to reflect a minimum braking nor steering distance.

More of my thoughts to keep you all thinking

Damon

In regards to using a term such as "reasonable distance", the reason why a dimension (i.e. 25' radius, 25' from 15 mph) is given is to take out the subjectiveness of the rule. One team's "reasonable distance" might be different from another team's. It would be hard for an official to be objective with that type of wording.

In response to battery weight vs. DOT tires. I've been looking for DOT tires I can put on what used to be our class 2 car, I found an awesome pair of Cheng Shin Moped tires from moped warehouse for 8 bucks a piece. They way the proposed rules are written I can run 134 lbs of batteries on those tires. DOT sounds great and safe until you exceed

the weight, speed and psi ratings on them. I'd argue we should allow 67 lbs of batteries and only 67 lbs in class three no matter what. Or come up with lots more rules about DOT tires, but the likened theme seems to be less is more.

Trying to figure the equivalency of multiple types of batteries could be a bit challenging in the future. 67 lbs is cut and dry. Teams can still run 48 v if they want to; they just have to find the right batteries. There are moped DOT rated tires that look very similar to the tires we use now.

I think keeping class 2 the way it is is a good idea.

I'm not volunteering at this point but a standard chip for speeds is a good idea. I will ask our local electronics entrepreneur if he can hook us up. (the one that developed the chip for bridges)

A min requirement for turning and braking is a good idea.

Maybe a max weight would be a good idea too. My colleague is converting a tractor to run on electric for a local farm, as it stands, it meets requirements for class 3.

Using the presented watt/hours, these are the following amp/hour capacities at c20 rate:

2 batteries(24 volts) = 85.5 max amp/hours

4 batteries(48 volts) = 42.5 max amp/hours

Using optima batteries for the 4 batteries, D50/51 at 26 pounds each = 104 pound pack weight.

Optima does not make a 85.5 amp/hour battery. I did find some batteries at 78 amp/hours. They weigh 53 pounds each = 106 pound pack weight.

Could you run DOT rubber on a class 2 car? You bet, but remember it has to be a four wheeled configuration, which reduces the loading on the tires, but the DOT tires increase rolling resistance.

Do we need to specify a minimum DOT tire size? Good question. We used 80/90-10 fronts and 205/50-10 rears last year. That vehicle did run four Electrathon legal batteries at 48 volts. That chassis was heavy and the pack weight was a full 134 pounds. Those tires have shown no signs of overloading. With the rules presented, that vehicle would weight even less do to the battery requirements. If we utilized new battery technology, it would weigh even less. But if we spec a tire, does that take away from the creativity of the class? I'll leave that decision to the rules committee.

If the tractor meets the basic vehicle configurations (i.e. 4' x 12' max size) and the safety rules (i.e. roll bars and side impact), it would be allowed to run. I do believe the same vehicle configuration rules would apply to class 3. If it does not state that, it should be added. This would eliminate tractors, full-sized cars and other common street vehicles. To the rules committee, do the same configuration rules apply to class 3? I thought they did, but it might need to be expressly stated.

I guess I'm just trying to find a way we can run our Li-Ion batteries. As I read it, I'm going to have to put a DOT tire on our car. I guess I'd like to see class 3 opened up a little more, and if we don't mess with class 2 then most vehicles will fit into class 2 like they traditionally did. Class three would give different battery chemistry and XRV's a place to race. I think that's the whole reason class 3 was created anyway.

I'm also a little unclear of the watt/hour calculations, could someone post an equation for this.

If you are running 4 DOT rated tires, batteries must not exceed 2,052 Watt/Hours at a C20 discharge rate.

I was mistaken... you could run three DOT tires, but you are limited to 1026 watt/hours.

Don't feel bad about the watt/hour calculations. I had to do some research too!

To calculate watt/hours: Divide the watt/hours by the number of batteries you want to run. Then divide this number by the battery voltage to get your amp/hour capacity.

So... let's take the 1026 watt/hours for a two battery pack. $1026/2 = 513$. Then take $513/12$. Your max amp/hours would equal 42.75 amp/hours at C20 rate. You could run your current class 2 car in class 3 with the new batteries, as long as the watt/hours equal 1026.

Hopefully Dave will double check these and let us know if we're on the right track. He's the guru of battery calculations.

Thanks, but now I'm really confused. by 1026 do you mean to say 1128 watt/hours as it says on pg two in the new rules?

So let me get this straight, $1128/2=564$. Our batteries are 18v a piece so $564/18=31.3$. So we would be able to use our batteries? The original way I figured it meant we would not. I thought that rule was meant to allow new technology but limit it's advantages, which would be a bummer.

And what does the C20 have to do with it. That means the amount of watt/hours it takes to discharge the battery over 20 hours. c20 is 1/20 the batteries capacity. I read the rule as follows

Our batteries are rated at 18v 68amp/hours (I think) so my take is $18*68=1224$ watts/hours which would exceed the 1128 limit. And that's just one battery. I'm clearly confused, help.

You are correct.... the rules say 1128... I was using 1026 as an example.

I double checked your calculations. If you are using just two batteries, you would need to find out the C20 discharge rate. Multiply that number by the voltage and as long as it's less than 564 (which is $1128/2$) you are good to go. By the looks of it right now, I would say you are legal. Could you post the C20 discharge rate? Then we could be certain. If your C20 discharge rate is less than 31.3.... your team has the green light to run those batteries, with no other changes to your vehicle.

1026 was just my example. Sorry for the confusion.

Double check the discharge rate of your batteries. By using the numbers in the rules and your battery voltage, the maximum C20 discharge rate is 31.3 amp/hours. The C20 discharge rate, I believe, is an industry standard. I think this is the way the rules committee came up with to make sure everyone is on a level playing field.

Call Dave up at Bayfield to get more detailed explanation. I'm sure he'd help you with your battery questions.

Network is having problems over here.... posted this twice.

http://www.valence.com/assets/pdf/ucharge_xp_data_sheet.pdf

We have the UEV-18's. The spec sheet only offers a c/5 discharge rate of 65 amp hours, can we use these batteries in class 3?

The rules may want to include an equation to clarify this rule.

I just got off the phone with Valence. They are getting the information and will call me back. I will post it as soon as I get it.

In the crash protection area, you have included battery boxes into the 6" rule. A single Optima battery measures approx 8" high by 10" wide by 7" deep. If we want to place these on the outside of the vehicle, like Bayfield and Preble have done in the past it we will have to include at least 2 horizontal bars of 12" plus the bracing and support, may not seem like much but when given all the other required materials we need to have it all adds up. My question is why are we limiting the kid's creativity and forcing the batteries (effectively) inside of the vehicle, thereby making the total frame larger? If safety is the answer I am going to get, then point me in the direction of the incident that occurred thereby causing this rule change.

Thanks Damon for pointing that out. Missed that one. Will have to have the students redesign their battery mountings. Not a big deal, but needs to be done to meet the rules.

Luke,

We don't mean to limit the advantages of other battery chemistry, just make them similar to a baseline energy storage. In reality, we don't want the cars to go faster by giving them more juice. We want them to make more efficient use of a limited amount of juice. There are also track speed limits and just basic overall safety.

Jeremy,

Here are the original calculations my class and I made when we were trying to keep the energy levels similar between lead acid and lith-ion (or other battery chem. of your choice for class 3

Optima (Red Top 35)

$12.8v \times 44 \text{ Ah} = 563.2 \text{ Watt Hours} / 33.1 \text{ lbs} = 17.0 \text{ Watt Hour Pounds}$
 $563.2 \text{ Watt Hours} \times 2 \text{ batteries} = 1128 \text{ Watt Hours Total}$

Lith-Ion(uev-18xp)

$19.2 \times 65 \text{ AH} = 1248 \text{ Watt Hours} / 32.7 \text{ lbs.} = 38.2 \text{ Watt Hour Pounds.}$

As far as the Discharge rate, all of these calculation are for a C20 rate(described below) . We should probably be using the C1 rate because that is what we are putting these batteries through during the endurance competition. But in my experience the C20 rate seems much more available from the battery companies. Battery manufacturers should be able to provide this info to you.

C20 Discharge Rate (from web site listed below)

An expression describing rate of discharge. The number indicates the number of hours to completely discharge the battery at a constant current. So C/20 is the current draw at which the battery will last for 20 hours, C/1 is the current at which the battery will last 1 hour. The useful capacity of a battery changes depending on the discharge rate, so battery capacities are stated with respect to a particular rate. For instance, a particular model of Hawker battery is rated at 42 amp-hours at the C/10 rate of 4.2 amps, but only 30 Ah at the C/1 rate of 30A. Also written as the 20-hour rate, 1-hour rate, etc.

Battery Glossary Web Site:

<http://www.rtpnet.org/~teaa/battery.html>

Here is a rule that was imposed last year that I would like to discuss and see changed.

We now make our vehicles stay in the pits for 1 minute (assuming a timer is present and not timing a different vehicle). This rule was created, I believe, to equalize the vehicles regardless of the number of drives. For EC North this rule discouraged us from changing drivers. Something we did the previous year (05-06). When we changed drives we had to change ballast and harness settings. With one driver we just have to carefully get out of the vehicle, walk around the vehicle, then reenter and sit the remaining time. Imagine if others venues who are racing had just sit and waste the time to energy efficiency ratio. I would like us to return to the original Electrathon USA rules from Iowa that said if you have two drivers you change as fast as possible and leave the pit, and if you have one driver you get out, walk around the vehicle and reenter and drive off. Let the teams decide the best method for them. Then with all things the same (25mph), the race may be won in the pits. Let us race.

Damon

I would be in support of Damon's pit stop idea...

Dave

I agree with Damon's statement as well. As said, this is what Iowa holds to and what we originally used. I know safety was a concern (underlying) when this rule went into place. Having the drivers running as fast as they can out of and around and back in their cars... To my knowledge, each WI race has a PIT BOX which no students are supposed to leave and no cars are supposed to drive thru... Place an official in every pit box when a car comes in and have that official watch the pit crew to be sure they do not leave, nor does any other car drive thru their box.

I do understand "Safety First". I question if this is that kind of issue or not. If it is, keep the rule. If it is just to equalize the playing field, then I question why we are at this challenge level? We do not restrict the type of motor or the specific brand of battery or the weight of the cars or ..., why the time of driver change? (If safety is the true reason, I am on board 110%)

Jesse Domer, Watertown High School

Ok, I am going to try and be calm with this one, non-threatening :)

To piggy back Damon's question on times in pit lanes, and my direction on safety vs. equal playing field.

Why do we have a minimum driver weight? I have heard OVER AND OVER it is to equalize the playing field. We are only a high school level event and we do not want to create a situation where it is unattainable to ever beat xyz team because of ?

I still ask the question. One of the goals of the challenge in many ways is to create the lightest car possible that can still be safe to the rules, hold the inspections, slalom and brake and drive fast. The heavier the car, the more mass we have to move with the same amount of batteries as everyone else. AHA! There is the equalizer. Batteries. If a team can find a 110lb sophomore with their license, why do we need to add 70 lbs to the car for ballast? Watertown's Varsity Class 2 car will be adding around 40-50 lbs of ballast weight to their car this year for the driver. (Now this creates engineering problems as well which I enjoy advising my team on "Where do we place that weight to HELP us," but why should they need to?) Let the teams figure out that an extra 10-20 lb driver with experience is far better than the lightest driver that just got their license in ?April...

ok, sorry. I know this is not really a question for Wisconsin anyways as a few of our cars currently with 180 lb drivers can make the hour at the speed limits given at RA and FVTC. This is more of a question for Iowa with no speed limits, why are we still keeping this rule? (this rule no longer exists in 3 of the 4 gas Supermileage challenges in WI)

Jesse Domer, Watertown High School

www.GoslingElectric.com

Luke,

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Couple Questions? Doesn't $563.2 \times 2 = 1126.4$?

I don't understand why the DOT specs list 2052, shouldn't it be double the 1126.4 to equal 2252.8?

If those are the true regs than the MK ES40-12 should be taken off the list, they exceed 1126.4 at $45 \times 12.8 = 576 \times 2 = 1152 \text{ watt hours}$

<http://www.mkbattery.com/images/ES40-12.pdf>

I also question this method of calculation, by adding PV panels and Regenerative braking, aren't we effectively adding to the amp hours? Thus the amp hours would increase. We also have no way to measure and calculate how much each car will output from their braking and pv panels, not to mention how bright the sun is.

I'm confused on the intent of class 3, there were never any specs on the amount of power used, only weight. I also do not understand the logic behind the 4 batteries allowed for DOT tires, I have no problem with 4 batteries being used because there is more rolling resistance, but how is this equated to the 1128 watt/ hours cars. Have we measured the rolling resistance and weight in relationship to the other cars and determined that they are equal in adding double the watt/ hours? I question the intent of class 3, it isn't much different to class two. My fear is that class 3 will be challenged continually with new technologies in the future, and the way the current rules are written, we will again be faced with changes. I propose we open up class 3 a little, lifting power restrictions but keeping weight restrictions, while focusing on safety, and leave class 2 the way it was.

Other inconsistencies in class 3 would include DOT ratings in relationship to weight, there are DOT tires that will be exceeded in weight ratings with 4 batteries + frame. Are we going to need to check psi as well?

I'm no expert, but I'm sure that there are far superior PV panels compared to others, however there is no power restrictions on these or regenerative braking systems.

"but do not strictly comply with the rules of the competition" is a very broad statement.

I'm glad we are discussing speed limits and monitoring them in another topic.

Why are we putting colleges in Class 3? Do we assume that their cars will be so different that they will not fit in class 2? Could we let them race in class 2 and just offer a different award for them?

In response to limiting the amount of juice, isn't the ultimate expression of the viability of electric cars their ability to perform by achieving acceptable distances at acceptable speeds? The lack of juice and the limited distances are the reasons we don't see more today. All we do from year to year with Lead acids is prove that electric cars are not a viable technology. I don't see any safety concerns in lifting the power restrictions but keeping weight restrictions if there are speed limits.

Enough ramblings for now, Hope all have a Happy Thanksgiving and get dat big buck.

Hope that qualifies for my positive response domer.

Lith-Ion(uev-18xp)

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Good Evening,

So this post has been dormant a while, wondering if the Electrathon board/rules committee has reviewed some of these comments/concerns with the new rules and if they are wanting more clarifications or when we might expect the next/final revisions to come out? I know this can be a busy time of year though.

I am particularly interested in seeing if anything has been done with class 2 or if it is staying as the last revision stated? I know in talking with other advisors, they are also interested to hear where this post has taken us with class 2 since the previous revisions. Not that this will change our direction in building the vehicles this year, just would me nice to know where we fit so I can officially tell my team.

Jesse Domer - Watertown High School

We are also interested in any timelines on the decision making process. We are thinking of bringing 3 vehicles this year and it would be nice to know what changes we will need to do to make this happen.

Happy shoveling

Damon

I think Sarah has posted new version of rules.

Here is my take on some class three issues...

In competition conditions, 2 sq. meters of panels will add a very minimal amount of energy to the overall picture. I measured some panels I have a school (Siemens) and they produce about 75 watts at 12 volts (.6 sq. meter) in ideal conditions (orientation, angle, temperature). So at ideal conditions (which will never be achieved in a dynamic moving vehicle for one hour) 57 Watts (Watt hours if we assume its producing for an hour) Should we add 57 WH to the overall watt hours?

As far as regenerative braking - I think this is a mute point. The only way amps will be added to the battery is if the vehicle is braking. When do these vehicle brake during and endurance competition? Either coming into the pits or to avoid an accident. Otherwise - "Don't brake my car" efficient driving techniques do not involve heavy (or any) use of the brakes. Light acceleration and lots of coasting. Even if they do brake (for example when entering the pits) they are going to be using way more amps accelerating back up to speed then they gain from the "regen" braking system. It is still a net loss of amps. However, compared to a vehicle that doesn't have "regen" braking they will lose less - but I believe it will be a minimal gain over the hour endurance competition. AND to use a regen braking system will need a non-free wheel based drive system which will reduce the overall efficiency during coasting.

Rocky Mountain Institute

(Web Site: <https://old.rmi.org/sitepages/pid433.php>)

"When you hit the brakes, the car's kinetic energy is converted to heat through friction—throwing away the energy that was previously used to accelerate the car. In city driving, about 30 percent of a typical car's engine output is lost to braking. This proportion drops to almost zero in highway driving, where braking is much less frequent."

IMO - the PV panels and "regen" braking is put in there to open up the contest to other possibilities. Let's not say no, but let a student do the calculations on their own. If they believe after studying the issue that they can make their vehicle more effect using PV or "regen" then build it and prove it on the competition track.

Don't Brake My Car!

Question, the W/h ratings will not allow the MK batteries to be used in Class 3 and the ratings for DOT will not allow 4 red tops? Am I correct?

If teams are running batteries that exceed the W/h restrictions (4 red tops) and prove they are spending those extra W/hours then will they be allowed to compete?