

# MINNESOTA TECHNOLOGY EDUCATION ASSOCIATION 22<sup>nd</sup> ANNUAL SUPERMILEAGE CHALLENGE

May 17-18, 2010

## 2009 - 2010 RULES

*Rev. 10-20-09*



### Overview of Competition:

The objective of the competition is to provide Industrial Technology/Technology Education students and MTEA Clubs with a challenging project that allows practical experience in design, fabrication, and testing. This is exactly what the STANDARDS FOR TECHNOLOGICAL LITERACY from the International Technology Education Association are all about!

In an effort to increase support and promote Technology Education, public awareness in the area of fuel economy and student involvement, a fuel economy competition will be held every spring. Competing students and clubs will be challenged to build a one-person, fuel efficient vehicle powered by a single cylinder four stroke cycle engine. The vehicles will run a specified course at a certain speed.

New schools to the competition are allowed only one vehicle entry their first year and they must compete in the Stock Class. Returning schools are allowed a maximum of two vehicle entries during their second year, and may compete in the Stock, Modified, Experimental, and/or E-85 Classes. Schools entering for the third time may enter three vehicles. Schools that are returning for a fourth year (or more), may enter four vehicles. Stock, Modified, Experimental, and E-85 classes will not compete against each other. Each competes in a separate class.

This competition is open to entries from Industrial Technology Education classes and student clubs from Minnesota schools. **(Advisors must be a current MTEA member)**

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# 2010

## 22<sup>nd</sup> ANNUAL MTEA SUPER MILEAGE CHALLENGE NOTICE OF INTENT TO ENTER

**Our Tech-Ed class/club would like to enter the 2009-2010 MTEA Super Mileage Challenge:**

Name of School: \_\_\_\_\_ School District # \_\_\_\_\_

**Materials will be sent to:**

Name of Advisor/s: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

E-Mail: \_\_\_\_\_

**Phone Numbers:** School (\_\_\_\_\_) \_\_\_\_\_ Fax (\_\_\_\_\_) \_\_\_\_\_

Home (\_\_\_\_\_) \_\_\_\_\_ cell phone (\_\_\_\_\_) \_\_\_\_\_

Number of vehicles entering: \_\_\_\_\_ **circle one class below for each car:**

- |         |       |          |      |              |
|---------|-------|----------|------|--------------|
| Car #1. | Stock | Modified | E-85 | Experimental |
| Car #2. | Stock | Modified | E-85 | Experimental |
| Car #3. | Stock | Modified | E-85 | Experimental |
| Car #4. | Stock | Modified | E-85 | Experimental |

New **Schools or Advisors** MUST run only one vehicle in the STOCK class.

Please return this form to: **Mike Sandell**  
**Chisago Lakes High School**  
**29400 Olinda Trail**  
**Lindstrom, MN 55045**

**E-mail:** [mteasupermileage@chisagolakes.k12.mn.us](mailto:mteasupermileage@chisagolakes.k12.mn.us)

**THIS FORM AND \$60 ENTRY FEE (per car) MUST BE RECEIVED NO LATER THAN**  
**November 30, 2009**

All Late ENTRIES/MONEY that miss the deadline will cost \$90 per vehicle to compete!! (\$60 entry fees and \$30 late fee).

**Teams with late proposals or waivers will not compete for trophies!!**

PLEASE PLAN AHEAD. PLEASE BE SURE THE INFORMATION ABOVE IS ABSOUTELY CORRECT!!

"Please use the reverse side of this sheet to comment and tell us how we can improve this year's challenge!"

<http://mtea.net/supermileage/smhome.htm>

# **2010 MTEA Supermileage Proposed Schedule of Events**

*(subject to change)*

## **Sunday, May 16:**

**7:00 pm** Gates open

**7:00–9:00** Team Check-In.

\* Teams will be given a Technical Inspection line up number and Tech Inspection packets after they turn in their Team Check-In form.

\* Tech inspection starts at 8:00 am Monday morning.

**7:00–9:00** Team pit area setup.

**7:00 pm** Competition Committee set-up

\* Administration trailer setup

\* Track setup

\* Technical Inspection area setup.

\* Tech Inspection training for officials.

## **Monday, May 17:**

**7:00 am** Gates open.

**8:00 am** Tech Inspection begins!

**11:00 am** All teams must be on site and checked in! Late arrivals will not be allowed to participate in the competition!

**12:00 pm** Required Advisors Meeting. All advisors must attend. If you miss this meeting, you and your team(s) will NOT be allowed to participate in the competition.

**12:30 pm** Required Drivers Meeting. All participants in the competition must attend!

**12:30–1:30** Technical Inspection temporarily closed.

**1:00 pm** Sponsor awards and group pictures

**2:00 pm** First competition run begins!

**7:00 pm** Technical inspection closed.

**8:30 pm** Last vehicle leaves start line.

**9:00 pm** All vehicles must be off the track.

## **Tuesday, May 18:**

**7:00 am** Gates open.

**8:00 am** First run for day 2

**2:30 pm** Last vehicle run of the 2009 competition.

**3:00 pm** All vehicles must be off the track.

**2:30-3:30** Pit area clean up

**4:00 pm** Awards ceremony

# **I. GENERAL RULES**

## **A. General Configuration**

1. The vehicle must have a minimum of three wheels touching the ground at all times.
2. Vehicle length, width, and height will not be regulated.
3. Teams must provide an 8½” wide x 11” high location on both sides of the vehicle for official vehicle numbers.
4. Body roll cage must protect driver. (2" above helmet of all drivers) \* Detailed in section II-B.
5. NO head first vehicles will be allowed. Drivers are not allowed to operate a vehicle in a prone position.

## **B. Engine Classifications**

*If you have any questions or need clarification about any engine classification rules, please contact the MTEA Supermileage Competition Committee.*

### **1. STOCK CLASS**

- a) The allowable base engines are an air cooled, four stroke cycle and must be Briggs & Stratton models 50032 (2.4hp), 93432 (3.5hp), or 60102 (2hp). The NEW base engine is model 50032-0005-E1 Vanguard series. The model # 93432 or model #60102 L-head engines will continue to be grandfathered in.
- b) The engine used on a stock vehicle must be box stock.
  - (1) No changes or modifications to the stock flywheel.
  - (2) No air filter removal or changes (including the stock filter canister)
  - (3) No changes in exhaust. The stock muffler must remain in place. \*Detailed in section II-H.
  - (4) Governor mechanism must remain on the engine. The governor link may be removed
- c) Lengthening of the recoil rope is allowed to suit engine and driver positions.
- d) No other modifications to the engine (internal or external) are allowed in this class.

## 2. MODIFIED CLASS

- 1) The allowable base engines are an air cooled, four stroke cycle and must be Briggs & Stratton models 50032 (2.4hp), 93432 (3.5hp), or 60102 (2hp).. The NEW allowable base engine is model 50032-0005-E1 Vanguard series. The model # 93432 or model #60102 L-head engines will continue to be grandfathered in.
- 2) The block must remain stock from the main journals down.
- 3) An engine proposal for any modifications is required. \*(outlined in Section III-J)
- 4) If no Engine Proposal is submitted, a vehicle must run in Exhibition Class!

## 3. E-85 CLASS

- a) This class will follow the same rules as the Modified class.
- b) Engines must be tuned to run a fuel mixture of an 85% Ethanol blend fuel.
- c) An engine proposal for any modifications is required. (outlined in Section III-J)
- d) If no Engine Proposal is submitted, a vehicle must run in Exhibition Class!

## 4. EXPERIMENTAL CLASS BRIGGS

- 1) This class will include any Briggs & Stratton engine other than base engines listed in the Stock Class. The allowable engines include Briggs prototypes, micro engines, Vanguard series, Intek series, or any other Briggs & Stratton engine new or old.
- 2) Any type of engine modifications (internal or external) are allowed as long as the base construction remains Briggs and Stratton.
- 3) The block must remain stock from the main journals down.
- 4) An engine proposal for any modifications or specifications is required. \*(outlined in Section III-J)
- 5) If no Engine Proposal is submitted, a vehicle must run in Exhibition Class!

## 5. EXHIBITION CLASS

- a) The Competition Committee may reassign a vehicle into this non-competing class. Vehicles in this class must pass all Technical Inspection checks in order to participate.
- b) Only Briggs and Stratton engines are allowed in the competition.
- c) Performance Run calculations will be done but the vehicle will not be eligible for any awards.
- d) Reasons for reassignment into this class may include, but not be limited to:
  1. Failure to meet specified deadlines.
  2. Incorrect or inadequate Design/Engine Proposal.
  3. Not meeting vehicle requirements for a specific classification.
  4. Out of state entries.
  5. Other rulings made by a panel from the competition committee for unique circumstances that require a ruling on-site before/during the competition.

### ***C. Maneuverability***

1. Each vehicle must have a steering geometry capable of a 35 foot minimum inside turning radius.
2. Drivers must have adequate visibility to avoid collision with other vehicles and maintain course direction.

### ***D. Stability***

1. Each vehicle will be required to demonstrate its longitudinal stability. The vehicle, with the qualified driver, must maintain full wheel contact on a ramp of 15 degree (measured from horizontal) when located statically on the ramp to the following configuration.
  - a) One front wheel and one rear wheel of the vehicle must contact a horizontal line (running the length of the ramp) on the ramp with the vehicle in full right and left turn positions. No supporting structure or wheel may contact the ramp below the horizontal line.
  - b) The steering wheel/wheels are to be turned lock to lock on the 15° angle ramp and the vehicle must demonstrate NO tipping.
  - c) This test must be performed without help to stabilize the vehicle from the pit crew.

## **E. Fuel**

1. The fuel used for the Stock, Modified, Experimental, and Exhibition Class vehicles will be ethanol (10% Blend) so as to provide uniformity in the composition. It will be purchased on the first day of competition, for best results.
2. E-85 Class Fuel (85% Alcohol Blend) will be provided on site for the vehicles in the E-85 Class.
3. Fuel and fuel bottle for 2-cycle engines will be provided by the school. Bottles will be weighed in the same manner (before and after competition run) as other vehicles in the competition.

## **F. Driver Weight**

1. Minimum driver weight is 130 pounds, fully equipped, including helmet.
2. Drivers who do not meet the minimum weight requirement must provide ballast to bring their weight up to the 130 pound base limit.
  - a) Ballast must accompany the driver and may not be removed during actual competition. When several pieces are carried, they must be in a bag (i.e. book bag, etc.)
  - b) Diver's belts or similar weights are suggested.
3. Any driver requiring ballast weight will receive a special colored wrist band. The driver will be reweighed by an event official at the completion of each performance run to verify a legal weight.
4. All drivers must have a valid drivers license.

## **G. Electric Start Restrictions**

1. The electric starter cannot be used to propel the vehicle forward in anyway (from a stopped position or while coasting).
2. Any vehicle found using an electric starter for forward propulsion will be eliminated from further competition and all previous successful runs will be forfeited. No exceptions.
3. Vehicles with electric start and using a centrifugal clutch must demonstrate that the clutch is not locked and will turn freely of the electric start!
4. Vehicles with electric start and using a belt drive system must have an electric start off switch connected to the belt drive system. Drivers must demonstrate to judges that when the belt drive system is engaged that the electric start is switched off and cannot be engaged in any way!
5. Stock engines may run electric starters, but the engine must not be changed in any way! (example: starters are allowed on the output shaft or drive train parts on Stock Class vehicles but the flywheel or recoil cannot be modified in any way).

## **H. Additional On-Board Equipment**

1. Batteries can be carried in each vehicle, and in no way can they be used to propel the vehicle.
2. The sole source of vehicle propulsion must be from the engine. This means no human power system, sails, etc.
3. If any inertial system is used, it must be at rest prior to the start of any performance runs.
4. Any vehicle found in violation of these rules will be eliminated from competition and any completed runs will be forfeited.

## **II. REQUIRED SAFETY ITEMS:**

In order for the vehicle to pass Technical Inspection, the following are the minimum safety items required of all vehicles. Failure to comply with these specifications at any time will result in removal from the competition until such infractions are corrected. **The Competition Committee reserves the right to call questionable vehicles to the Officials Building to re-inspect and determine if a said vehicle violates any competition rules.**

### **A. Kill Switches**

1. A minimum of two kill switches grounding the engine ignition are required. One must be mounted in easy reach of the driver, and one must be accessible from outside the vehicle (for pit crew). The factory mounted engine kill switch does not count as one of the required kill switches.
2. All kill switches must be a toggle type with a minimum of a 1/2" metal paddle. Plastic switches or doorbell type, or other momentary action switch style will not be allowed.
3. For all Stock Class vehicles, the existing switch in the shroud of the engine must remain as an additional functioning kill switch.
4. **The exterior kill switch must be marked with a bright color marking, the switch plate no less than 2" x 2" square. RUN and KILL positions with 1/2" tall letters (minimum).**
5. All kill switches on the vehicle (for driver, pit crew, and on engine shroud) must be functional and capable of stopping the engine at all times.

## **B. Roll cages and body panels**

1. The purpose of the required cages, panels, and shields is to maintain student safety in case of an accident.
2. The driver's body (including arms and legs) must be substantially enclosed by body/frame/rollcage at all times while driving.
3. Roll cages are required. They must be substantial and prevent accidental contact between the ground and the driver's arms & legs. **If vehicle is a frame covered with shrink wrap, frame must be first point of contact in case of a roll over.**
4. **The required roll bar must be located directly above the highest point of the driver's helmet in the driving position. The roll bar must extend at least 2" above the driver's helmet**
5. All drivers, when belted in, must not be able to extend their head over the roll cage.

## **C. Body**

1. The driver must be shielded from the ground using a substantial material.
2. Plastic film such as shrink wrap is not an acceptable material for protecting the driver from contact with the ground.

## **D. Driver attire**

1. The driver must wear a motorcycle type (DOT approved or Snell rated helmet). A hard shell bicycle type helmet will NOT be allowed.
2. Eye protection must be worn by the driver at all times. It may be a full-face visor shield, prescription glasses, sun glasses or approved safety glasses.
3. Shoes are required to be worn during the performance run. Sandals are not allowed.
4. Drivers must be wearing minimum standard short sleeved shirt and shorts.

## **E. Fuel and Lubrication Systems**

1. Fuel and lubrication systems should be designed so that any loss of fluids will not result in a fire hazard. The entire fuel bottle must be mounted below and behind the vehicle firewall.
2. Pressurized bottles will not be allowed, with special exception to modified engines using fuel injectors.
3. All push-on fuel lines fittings must be clamped. Secure loose lines to the vehicle.
4. Care should be taken to provide a readily accessible mounting location for the fuel tank.

5. All fuel bottles must stand straight up. No tilting of tanks in any way will be allowed.
6. All fuel lines must be **clear and colorless plastic**, ¼” I.D. and total length no longer than 24 inches.
7. Fuel lines must be long enough, and in clear view, to remove all air bubbles between the carburetor and the fuel bottle.
8. Fuel filters are optional. They must be clear to visibly remove any bubbles that may occur during any runs. They must be installed within 6 inches of the fuel bottle. Filter must be installed prior to Tech. Inspection. (note: be sure to install the filter in the correct direction for proper fuel flow).

## **F. Brake System**

1. The brake system must be adequate for safely stopping the vehicle in a reasonably straight line.
2. Brakes must hold the vehicle and driver on the 15 degree ramp in a fully-stopped static position when the vehicle is aimed in a downhill position.

## **G. Fire Extinguishers**

1. A multipurpose (min. 2 lb.) ABC dry chemical fire extinguisher, rating No. 1A10BC or equivalent must be provided.
2. The extinguisher must be securely mounted so that the driver can direct the extinguishing agent on the fuel tank and engine area.
  - a) If the driver has sufficient freedom of movement in the event of a fire to remove the extinguisher from its bracket and direct it on the above mentioned areas, the design will be allowed.
  - b) If the driver does not have sufficient freedom of movement, some method must be provided to accomplish the desired result (example: a system of tubing and remote actuation).
3. Alternate delivery systems will be allowed but only if actual test result documentation is available through a faculty advisor.
4. All fire extinguishers must be equipped with a manufacturers installed pressure/ charge gauge. Gauge must be readable for Tech Inspection.
5. All teams are required to have in their pits a large (minimum 5 pound) ABC fire extinguisher. This must be with you when going through Technical Inspection.

## **H. Exhaust System**

1. Engine exhaust must exit the vehicle body (exhaust cannot be enclosed).
2. Tail pipes must be added to the muffler to clear the body.
3. The muffler must remain in the factory position in Stock class.

## **I. Fire Wall**

1. A wall of steel, aluminum **or aluminum composite** material of 0.032" minimum thickness must separate the driver from the engine.
2. Firewalls must extend from the belly pan of the vehicle to the top of the roll bar. They must also extend to the sides of the width of the vehicle frame or body
3. Vehicles with an enclosed body must have a firewall that completely separates the driver's area from the engine compartment.
4. The fire wall cannot interfere with the operation and use of the fire extinguisher.

## **J. Exitability**

1. The driver must be able to exit the vehicle in less than 15 seconds, unassisted, in case of an emergency.

## **K. Rear View Mirrors**

1. All vehicles must be equipped with at least two (2) rear view mirrors that have a minimum of 7 square inches each. Mirrors must give the driver a clear view to the track area behind the vehicle. Convex mirrors are not recommended.
2. Rear view camera system will be allowed in lieu of mirrors if the viewing screen is at least 2" x 1½" and the image is displayed for the driver at all times.
3. Drivers must correctly identify an 8" geometric object at a distance of 15 feet behind the vehicle, while the engine is running!

## **L. Visibility**

1. The driver must have good visibility forward and to each side from 90 degrees from dead ahead.

## **M. First Aid Kit**

1. Each team is required to have with them, a large TEAM first aid kit. This must be with you when going through Technical Inspection.

2. The contents will be left up to the discretion of each school and team. It is good to have burn ointment and large gauze pads.
3. Large (school type) first aid kits are very good.

## **N. Seat Belts**

1. A minimum 3-point harness is required, including lap and shoulder belts. **Starting with the 2012 Challenge, a minimum 4 point harness will be required.**
2. Each driver is required to be belted in using an automotive type seat belt.
3. No tape or rope type harnesses will be allowed.
4. Five point parachute or Jr. Dragster type harnesses are superior, but not required.

## **O. Vehicle Marker Flag**

1. It has been requested by BIR that each vehicle have a Safety flag attached to each vehicle while operating in the pit and test area.
2. The flag will be a 5' rod ( 1/4" diameter) with an orange flag similar to a children's bicycle flag. The flag will be provided to each team at Technical inspection. (flags will identify the car number)
3. Each team is responsible to have a method of mounting the flag in place at the time of Technical inspection. Flag must be attached vertically on the vehicle.
4. The flag can be removed upon entering the start area and must be attached before leaving the finish area.

## **III. DESIGN PROPOSAL: (Please read instructions carefully)**

**A Design Proposal is required of every vehicle entered in the competition.**

The design proposal serves two purposes. First, it is an information document to determine how a vehicle adheres to the rules. Second, it ensures that the entry is a result of a genuine design effort.

**The competition committee will review all vehicle drawings and documents submitted as part of the Design Proposal approval process. Teams are responsible for preparing and submitting documentation to describe how they intend to construct their vehicle to follow all of the rules and maintain driver safety.**

The first section of the Design Proposal is the Vehicle/Power Train Design Proposal which covers items **III-A through III-I** below and must be received by February 28, 2010.

The second section is the Engine Design Proposal for Modified Vehicles which covers item III-J and must also be received by February 28, 2010. Engine Proposals are required if the vehicle is intended to compete in

the Modified, Experimental, or E-85 Class. Vehicles entering the Stock Class do not require an Engine Proposal.

The third section is the Re-Entered Vehicle Proposal which covers item III-K and must also be received by February 28, 2010. This is required for any vehicle which is being re-entered from a previous competition to document the changes that will be made to the vehicle by the team.

**Design Proposals must be submitted to the competition committee governing the Supermileage Challenge.**

**Mail to:**

**Mike Sandell  
Chisago Lakes High School  
29400 Olinda Trail  
Lindstrom, MN 55045**

**email: [mteasupermileage@chisagolakes.k12.mn.us](mailto:mteasupermileage@chisagolakes.k12.mn.us)**

**All Late ENTRIES/MONEY/PROPOSALS/WAIVERS that miss the deadlines  
will cost \$90 per vehicle to compete!!! (That's \$60.00 per vehicle PLUS a \$30.00 late fee.)  
DON'T BE LATE THIS YEAR!!**

### ***A. General Information:***

These proposals should be in the form of **drawings and written descriptions**. Changes in design between date of submission and competition date will be allowed; however, information regarding the **changes must be presented in writing** at the competition or re-submitted to the Competition Committee beforehand as a modified Design Proposal. If a team has built their vehicle to compete in a different class than they have listed in their Design Proposal, they must declare that to the Official when they enter the Technical Inspection area and bring with them a revised design proposal and be prepared to explain their changes from their original design. **If a revised Design Proposal is not submitted, the vehicle must run in the Exhibition Class.**

All design proposals will be held in strict confidence. **The following subjects must be covered in the design proposal and all Design Proposal submissions must follow the format listed below:**

### ***B. Cover Page (REQUIRED)***

The cover page must include the following information:

1. School Name,
2. Vehicle Class (Stock, Modified, E-85, Experimental)
3. Indication of "New" or "Re-entered" vehicle
4. Team Name (and/or) Car Name
5. Participating Students
6. Advisor(s) Name
7. Advisor(s) contact information (phone & email)

### **C. Basic Vehicle Configuration Drawings**

1. These drawings should show basic vehicle layout. This section of the design proposal should be in Orthographic Projection form and include all important information and dimensions.
  - a. Drawings showing the front, top, and side view of the vehicle (minimum requirements). Drawings may be done by CAD and/or traditional drafting techniques.
  - b. General arrangement and location of components identified on drawings:
    1. Wheels
    2. Engine
    3. Steering
    4. Firewall
    5. Roll bar
  - c. General dimensions
    1. Length
    2. Width
    3. Height

### **D. Vehicle Description**

1. A written description must detail the vehicle layout and components. This section of the design proposal should be in paragraph or bulleted form and must include the following important information:
  - a. General written description of vehicle describing chassis material, type and size, body components, and any other specific details unique to the vehicle.
  - b. Driver position while driving the vehicle.

### **E. Power Train Configuration**

1. This section should include a written discussion of how the engine is connected to the drive wheel/wheels.

### **F. Performance Calculations**

1. This section should include information on projected vehicle speeds (top), and braking and mileage estimates. Performance calculation resources are available at the MTEA Supermileage website

## **G. Brake System**

1. This section must include written description of the braking system. Additional drawings of braking system are also very helpful.
  - a. Brake operation and characteristics for each vehicle will be different. Vehicle speed and weight should be taken into careful consideration when designing a brake mechanism.

## **H. Cost Estimate**

1. An itemized estimate of the total cost of the vehicle must be provided with the Design Proposal.

## **I. Safety Items**

1. **Written description of all safety items in sections II-A through II-O. Clearly describe each item A through O.**

## **J. Engine Proposal (not required for Stock Class)**

1. An engine design proposal must be received by February 28, 2010 if the vehicle is entered in the Modified, Experimental, or E-85 class.
2. This proposal must itemize all planned engine modifications from the base engine, including the model number of the engine being used.
3. A list of all altered parts must be included in the proposal.

## **K. Re-entered Vehicles**

Because of the increasing expenses of the vehicles and their parts, the Competition Committee will allow vehicles to be run year after year, with the stipulation that modifications must be performed by the team each year. Vehicles can not be entered "as is". They must reflect an effort to improve the vehicle, its efficiency and safety. The MTEA Supermileage Competition Committee strongly suggests that all reentered vehicles be completely disassembled by the new team using it. This would allow team members to become familiar with the vehicle, its original design, safety features and to make an educated evaluation regarding redesign/modifications/changes to improve overall fuel efficiency, performance and safety. Schools have the option to reenter vehicles as long as the reentry follows challenge criteria.

In lieu of the traditional Design Proposal, a re-entered vehicle must submit a "Re-entered Vehicle Design Proposal" that covers all of the following items:

1. Any modifications from the previous design must be documented by drawings and written descriptions following the Design Proposal format of items III-A through III-J.
2. Changes/modifications from the previously entered vehicle design must be documented in the Re-Entered Vehicle Design Proposal by including digital photos to demonstrate that substantial changes will be made for this year's entry.
3. Teams must also submit a copy of the previous Design Proposal for any re-entered vehicle.
4. Changes must be explained clearly as to what improvements were made as part of the Design Proposal, as well as during Technical Inspection. This process will be left up to the integrity of the teams and advisors. However, many returning vehicles use parts from previous years, which is OK (such as engines wheels, mirrors, fire extinguishers, switches, gears, etc.).
5. Teams will need to indicate on Technical Inspection forms that the vehicle is a "re-entry". Inspectors will ask for, and expect to receive, detailed information regarding vehicle modifications from the previous entry. Competitors will need to demonstrate clear knowledge of vehicle modifications and the purpose of those modifications.
6. Modifications can be: (may be any or all listed below)
  - a. Structurally
  - b. Drive train and components
  - c. Aerodynamically
  - d. Technology applications
  - e. Safety features
  - f. AND consists of a new team creating the changes and operating the vehicle
7. A record will be maintained of all vehicle re-entries.
8. Any re-entered vehicles/engines must reflect major vehicle improvement modifications were made to improve performance, aerodynamics or economy. Vehicles that are re-entered and do not reflect a genuine effort to modify and improve the overall vehicle will be reassigned to the Exhibition Class at the conclusion of a successful vehicle inspection. Again, competitors will need to demonstrate clear knowledge of vehicle modifications and the purpose of the vehicle modifications.

## **IV. COMPETITION PROCEDURES:**

### **A. Team Check-In**

1. All teams must turn in a Team Check-In form immediately after entering the BIR facility to inform the event officials of the following items: advisor(s), on-site contact information, team waiver verification, and pit locations.
2. Teams will be dropped from the competition if the team has not turned in their Check-In form to the officials by 11:00 am Monday.

### **B. Technical Inspection**

1. Teams will be given a Technical Inspection line up number and Tech Inspection packets after they turn in their Team Check-In form.
2. Technical Inspection will begin on Monday at 8:00am and progress in numerical order.
3. A vehicle will not be allowed on the racetrack until after it has passed all sections of the Technical Inspection and received an official car number has been installed on the vehicle.

### **C. Advisors Meeting**

1. All team advisors must attend the Advisors Meeting at noon on Monday to receive specific event details.
2. Attendance will be taken at this meeting and the team(s) will NOT be allowed to participate in the competition if they are not present for the Advisors Meeting.

### **D. Drivers Meeting**

1. All team members and advisors must attend the Drivers meeting at 12:30pm on Monday to receive specific instructions, rules clarifications, and other important information.
2. Attendance will be taken at this meeting and the team(s) will NOT be allowed to participate in the competition if they are not present for the Drivers Meeting.

### **E. Start Line Area**

1. Prior to the performance run an official fuel tank (provided by MTEA) will be filled and weighed for each vehicle.
2. One of the team's pit crew will be required to attach the official fuel bottle to the car under the supervision of a competition official.
3. The start of the performance run will begin with the vehicle being placed just behind the start line. The vehicle engine is then started, either by driver or pit crew.

4. Timing for the minimum mph requirement starts when the vehicle crosses the start line. **VEHICLES CANNOT BE PUSH STARTED.**
5. Transmission design must be such that the engine can be disconnected from the driving wheel/wheels so as to allow the vehicle to coast or remain stationary with the engine running.

## ***F. Performance Runs***

1. Maximum speed limit is 30 MPH while on the track.
2. Speed limit is 5 MPH while in the pit area.
3. Helmet and eye protection is required any time the vehicle is being operated on track or in pit and test area..
4. Each vehicle will be required to complete two (2) laps around the 3 mile track area.
5. All vehicles will be required to maintain an overall minimum speed of 15 mph (24 Km/hr.). This would give each driver 24 minutes maximum to complete the two (2) laps (average of 12 minutes per lap) without a penalty.
6. Cars coasting are required to stay to the right hand side of all track areas.
7. Cars accelerating are required to keep to left side track areas.
8. Drivers must always look for other cars while driving, especially during accelerating!
9. Teachers/Advisors will not be allowed to work on the vehicles in the pits during testing and competition except to supervise student progress.
10. Teachers/Advisors will be assigned jobs upon completion of Technical Inspection. These tasks are during competition activities such as timers, spotters, or fuelers.
11. Advisor is responsible for all members of their team. Other students or parents may attend as spectators.
12. Once a driver has started a run he/she is the only person that can make repairs while the vehicle is on the track - pit crew members can get tools but cannot assist in any repair work!
13. Vehicles will be allowed to coast during mileage runs. Coasting vehicles must have a system for the driver to restart the engine.
14. Assigned judges will monitor vehicle speed during competition. Any vehicle that is driving excessively fast or recklessly will receive a warning and that driver will be suspended from anymore driving (including testing in pit areas), wrist band will be removed. A second violation will suspend a vehicle or team from any further competition!

15. No radar detectors will be allowed on vehicles.
16. The Competition Committee reserves the right to call questionable vehicles to the Officials Building to re-inspect and determine if a said vehicle violates any competition rules. If a vehicle is in violation of competition rules, it will be eliminated from the competition and any completed runs will be forfeited. The Competition Committee members reserve the right to tear an engine down and inspect it!

## **G. Finish Line Area**

1. Upon successful completion of the performance run the timers will record total elapsed time.
2. The fuel system cannot be touched until approval is given by an official.
3. An event official must approve a team pit member to remove the official fuel bottle so the team can bring it to the Official's Trailer for weighing.

## **H. Performance Run Calculations**

1. The miles-per-gallon rating for the vehicle will be computed by dividing the distance traveled by the amount of fuel used for each performance run.
2. If the maximum allowable elapsed time has been exceeded, the team will be assessed an "over-time penalty" of "-10 mpg" for each second that the vehicle was over the allowed time (24 minutes).
3. Teams best six (6) runs will be averaged for the challenge to determine class champions for each of the classes (Stock, Modified, Experimental, and E-85).
4. Exhibition class vehicles are not eligible for any awards.

## **I. Cheating**

1. Any team, or students, cheating, will be dropped from the challenge and all rights forfeited.

## **J. Alcohol, Drugs, & Tobacco**

1. We follow all MSHS League rules regarding Alcohol, Drugs, & Tobacco.

## **K. Appeal Process**

1. Any team who has a dispute with an Official's ruling/ scoring/ performance data decision will be required to create a written letter of appeal and submit it to a member of the competition committee in the Administration Trailer within 30 minutes of the ruling.
2. Any appeal must include the following items:

- a. Name of school
  - b. Car number
  - c. Detailed description of the dispute the team is appealing
3. The competition committee will consult to make a final ruling within 30 minutes of receiving any appeal letter.

**The fullest appreciation is expressed to the Society of Automotive Engineers for the rules used for this challenge!**