Consolidated Rules For Mini Baja SAE East, Midwest and West

2006 SAE MINI BAJA SAE® SERIES

2006 SAE MINI BAJAEVENT DESCRIPITION & SCORING

Event and Scoring Comparison Table

North American competitions

	East	Midwest	West
STATIC EVENTS – 300 points			
Design			
Report	100	100	50
Evaluation	150	150	100
Cost			
Report	10	10	10
Production Cost	40	40	40
Presentation	---	---	100
DYNAMIC EVENTS – 700 points			
Speed			
Acceleration	60	75	75
Traction			
Hill Climb or Pulling Event	60	75	75
Maneuverability			
Maneuverability	60	75	75
Specialty			
Water Maneuverability	60	---	---
Rock Crawl	--	---	75
Mud Bog	--	75	---
Durability			
Endurance	400	400	400
TOTAL POINTS	1000	1000	1000

2006 SAE MINI BAJA® SERIES CONSOLIDATED RULES

SECTION 1 GENERAL INFORMATION

11. OVERVIEW

The SAE Mini Baja ® competition originated at the University of South Carolina in 1976, under the direction of Dr. John F. Stevens. Since that time, the Mini Baja Series has grown to become a premier engineering design series for university teams.

11.1 Mini Baja Program Objective

Mini Baja is an intercollegiate engineering design competition for undergraduate and graduate engineering students. The object of the competition is to simulate real-world engineering design projects and their related challenges. Each team is competing to have its design accepted for manufacture by a fictitious firm. The students must function as a team to design, build, test, promote and compete with a vehicle within the limits of the rules, also to generate financial support for their project and manage their educational priorities.

11.2 Competition Goals

Each team's goal is to design and build a prototype of a rugged, single seat, off-road recreational vehicle intended for sale to the non-professional weekend off-road enthusiast. The vehicle must be safe, easily transported, easily maintained and fun to drive. It should be able to negotiate rough terrain in all types of weather without damage.

11.3 The SAE Mini Baja Series

For 2006 the SAE Mini Baja Series will consist of six competitions. Three competitions are held in North America under the sponsorship of SAE:

Mini Baja East – Hosted by Auburn University
Midwest Mini Baja – Hosted by Milwaukee Section
Mini Baja West - Hosted by Oregon Section

Mini Baja competitions held in Africa, Asia and South America are associated with SAE, but organized and sponsored by their local hosts:

Mini Baja Brazil - Sponsored and hosted by SAE Brazil
Mini Baja Korea – Sponsored and hosted by Yeungnam University
Mini Baja South Africa - Sponsored by Sasol and hosted by University of Pretoria

All Mini Baja competitions have open registration policies and accept teams of university students from any country.

Some sections of rules governing Mini Baja events held outside North America are specific to those competitions. Such variations are published on the individual competition websites.

The dynamic events at competitions may differ. Teams should check the websites of the specific competitions they are planning to enter and consider any unique requirements that might affect

the design and fabrication of their vehicle.

11.4 Official Announcements and Competition Information

Teams are required to read the newsletters published by SAE and the other organizing bodies and to be familiar all official announcements concerning the competitions and rules interpretations released by the Mini Baja SAE Rules Committee

The monthly SAE Collegiate Design Newsletter is published on-line and can be found at: http://students.sae.org/competitions/newsletters/

11.5 Mini Baja Email Listserv

The Mini Baja Listserv operated by **majordomo@autox.team.net** may from time to time be used for official communications from the organizers and the Mini Baja Rules Committee. We recommend that all teams subscribe to the Mini Baja Listserv. Instructions for subscribing to the Mini Baja Listserv can be found at: **http://www.sae.org/students/mbemail.htm**.

11.6 Official Languages

The official language of the SAE Mini Baja series is English. Document submissions, presentations and discussions in English are acceptable at all competitions in the series.

Team members, judges and officials at Non U.S. competition events may use their respective national languages for document submissions, presentations and discussions if all the parties involved agree to the use of that language.

Mini Baja East	English
Mini Baja Midwest	English
Mini Baja West	English
Mini Baja Brazil	Portuguese and English
Mini Baja Korea	Korean and English
Mini Baja South Africa	Afrikaans and English

12 SAE MINI BAJA RULES AND ORGANIZER AUTHORITY

12.1 Rules Authority

The SAE Mini Baja Rules are the responsibility of the SAE Mini Baja Rules Committee and are issued under the authority of the SAE University Programs Committee. Official announcements from the SAE Mini Baja Rules Committee, SAE or the other SAE Mini Baja organizers shall be considered part of, and shall have the same validity as these rules.

Ambiguities or questions concerning the meaning or intent of these rules will be resolved by the SAE Mini Baja Rules Committee, SAE or by the individual competition organizers as appropriate.

12.2 Rules Validity

The SAE Mini Baja Rules posted on the SAE website and dated for the calendar year of the competition are the rules in effect for the competition. Rule sets dated for other years are invalid.

12.3 Rules Compliance

By entering a SAE Mini Baja competition the team, members of the team as individuals, faculty advisors and other personnel of the entering university agree to comply with, and be bound by, these rules and all rule interpretations or procedures issued or announced by SAE, the SAE Mini Baja Rules Committee and the other organizing bodies. All team members, faculty advisors and other university representatives are required to cooperate with, and follow all instructions from, competition organizers, officials and judges.

12.4 Understanding the Rules

Teams are responsible for reading and understanding the rules in effect for the competition in which they are participating. The section and paragraph headings in these rules are provided only to facilitate reading; they do not affect the paragraph contents.

12.5 Participating in the Competition

Teams, team members as individuals, faculty advisors and other representatives of a registered university who are present on-site at a competition are considers to be "participating in the competition" from the time they arrive at the event site until they depart the site at the conclusion of the competition or earlier by withdrawing.

12.6 Violations of Intent

The violation of the intent of a rule will be considered a violation of the rule itself. Questions about the intent or meaning of a rule may be addressed to the SAE Mini Baja Rules Committee or by the individual competition organizers as appropriate.

12.7 Right to Impound

SAE and the other competition organizing bodies reserve the right to impound any on-site registered vehicle at any time during a competition for inspection and examination by the organizers, officials and technical inspectors.

12.8 General Authority

SAE and the competition organizing bodies reserve the right to revise the schedule of any competition and/or interpret or modify the competition rules at any time and in any manner that is, in their sole judgment, required for the efficient operation of the event or the Mini Baja series as a whole.

13. ELIGIBILITY

13.1 Individual Participant Requirements

Eligibility is limited to undergraduate and graduate students to Ensure that this is an engineering competition rather than a race. Individual members of teams participating in this competition must satisfy the following requirements:

13.1.1 Student Status:

Team members must be enrolled as degree seeking undergraduate or graduate students in a college or university. Team members who have graduated during the seven (7) month period prior to the competition remain eligible to participate.

13.1.2 Society Membership:

Team members must be members of at least one of the following societies: (1) SAE, (2) SAE Australasia, (3) SAE Brasil, (4) ATA or (5) IMechE. Proof of membership, such as membership card, is required at the competition.
Students who are members of one of the societies listed above are not required to join any of the other societies in order to participate in any SAE competition.
Note: Students can join SAE online at: www.sae.org/students

13.1.3 Age

Team members must be at least eighteen (18) years of age.

13.1.4 Driver's License

Team members who will drive a competition vehicle at any time during a competition must hold a valid, government issued driver's license.

13.1.5 Liability Waiver and Insurance:

All on-site participants and faculty are required to sign a liability waiver upon registering on-site. Individual medical and accident insurance coverage is required and is the sole responsibility of the participant.

13.1.6 Onsite Registration – Document Copies Required

All participating team members **must** – at the time of onsite registration – provide photocopies of the following documents and emergency contact data to be filed with registration officials:

(1) Photographic Identification Drivers must present a valid, government - issued, highway driver's license containing a photograph. Non-drivers may substitute alternate photographic identification such as a university ID or a passport.

(2) Proof of Insurance: Medical insurance card or other proof of medical insurance coverage.

(3) Emergency Contact Information: Each student must include the name and phone number of their emergency medical insurance companies.

13.2 Faculty Advisor

Each team is expected to have a Faculty Advisor appointed by the university. The Faculty Advisor is expected to accompany the team to the competition and will be considered by competition officials to be the official university representative.

Faculty Advisors may advise their teams on general engineering and engineering project management theory, but may not design any part of the vehicle nor directly participate in the development of any documentation or presentation. Additionally, Faculty Advisors may neither fabricate nor assemble any components nor assist in the preparation, maintenance, testing or operation of the vehicle.

In Brief – Faculty Advisors may not design, build or repair any part of the Vehicle.

13.3 International Participation – U.S. Visa Letters

International teams requiring visa letters to enter the United States must fill out the on-line form a minimum of four (4) weeks prior to the competition in which they are competing at: **http://www.sae.org/students/student.htm**.

13.4 International Participation - Vehicle Shipping/U.S. Customs

SAE and the Mini Baja organizers strongly recommend that international teams ship their vehicle(s) early in order to allow enough time to compensate for any delays that may occur in clearing U.S. Customs. Please check with the United States Customs Service concerning the regulations governing the temporary importation of racing vehicles. You may want to consider using the services of a freight forwarder who is familiar with the international shipping of racing

vehicles.

Neither SAE staff nor the Mini Baja Event organizers are permitted to provide advice on U.S. Customs matters.

14. ELIGIBILITY – VEHICLES

14.1 Student Created

The vehicle and associated documentation must be conceived, designed and fabricated by the team members without direct involvement from professional engineers, faculty or professionals in the off-road and racing communities.

14.2 Professional Fabrication Limits

Vehicles which have been professionally fabricated may be disqualified from the competition. If a team does not have access to machine shop facilities, the frame can be professionally fabricated without penalty. Lack of access must be documented (letter from faculty advisor, copy of policies which prohibit machine shop access, etc.).

14.3 Kit Vehicles - Prohibited

Vehicles fabricated from a kit or published designs are ineligible to compete.

14.4 Prefabricated Subassemblies

These rules do not exclude the use of prefabricated or modified sub-assemblies.

14.5 Previously Entered Vehicles

Vehicles that have competed in a Mini Baja competition during a previous year may be entered in this year's events only if: (1) the vehicle has been substantially modified since its previous competition and (2) the modified vehicle meets all of the current year's rules. The modifications must, in the opinion of the design judges, represent a rethinking and redesign of one or more significant vehicle systems. Modifications are defined as, but not limited to: New frame and/or roll cage design, new drive train design or arrangement (gear ratio changes are NOT considered as drive train modifications), new suspension design, driver ergonomics and controls. (For Mini Baja East Only - Flotation or water propulsion modifications are also considered to be design changes.).

14.5.1 Redesign Documentation

Teams entering modified versions of previously entered vehicles must thoroughly document their design changes. (See 14.8)

14.6 Top Ten Teams – Design Comparison Requirement

Teams with vehicles that finished in a top ten position in any of the previous year's Mini Baja competitions are classified as having created a "successful design". Teams that created such

successful vehicles are required to provide a comparison of their current design with their previous year's design **even if** the current design is entirely new. (See 14.8)

As part of the design event the judges will evaluate the comparison documentation of the top ten teams. Team representatives must be present during the comparison to discuss the design changes. If the judges find that the design changes are **(a)** not significant, **(b)** not supported by a detailed analysis or **(c)** have not been sufficiently documented, then a penalty of up to one-hundred (100) points may be assessed against the design score.

14.7 Redesign/Design Comparison Document - Format

The redesign/design document may be in the form of either, or both, **(a)** posters or a **(b)** report. The documentation should be a year to year comparison of the major structure and/or systems of the vehicle and may consist of any, or all, of the following, supported by appropriate captions: **(1)** plans, **(2)** drawings or **(3)** photographs. Design changes to correct failures of the previous design should be accompanied by a thorough analysis of why the failure occurred and the theoretical data supporting the new design, etc.

14.8 Duplicate Designs

Teams are reminded that the objective of SAE Mini Baja is to provide students with a design challenge that will enhance their engineering and engineering project management skills. Participating teams must be able to demonstrate their engineering knowledge either by designing a vehicle from scratch or by making significant changes to a previously entered vehicle.

If a school brings two vehicles that the design judges, in their sole opinion, find to be either identical, or to exhibit only insignificant differences, then the cars will be treated as a single entry with a duplicate car for parts. In such case only one car will be evaluated and permitted to compete in the dynamic events.

15. REGISTRATION

15.1 Maximum Entries per University

A maximum of two (2) vehicles per university will be allowed in the competition.

15.2 Registration Deadline

Teams must register for each Mini Baja competition they intend to enter by the deadline given in the Action Deadlines listed in the Appendix.

15.3 Registration Fee

North American Competitions - The registration fee must be paid on-line by credit card at the time of registration. Registration fees may not be paid by any other means.

Competitions Outside North America - Registration fees and procedures are listed in the Appendix or will be found on the competition website.

Registration fees are **not** refundable.

15.4 Registration Limit

15.4.1 Midwest Mini Baja - Registration Limit:

Registration for Midwest Mini Baja 2006 is limited to 140 vehicles. Registrations for Midwest Mini Baja will be accepted in the order in which they are received starting October 3, 2005 at 10:00 am Eastern Daylight Savings Time, and ending at 11:59 pm EST December 29, 2006 or when 140 teams have registered, whichever occurs first.

15.4.2 Mini Baja East and Mini Baja West - No Registration Limits

There are no registration limits for Mini Baja East. The registration is capped at 100 teams for Mini Baja West.

SECTION 2 VEHICLE REQUIREMENTS AND RESTRICTIONS

20. GENERAL DESIGN REQUIREMENTS

20.1 Vehicle Design Objective

The vehicle design should be attractive to consumers because of its visual appearance, performance, reliability and ease of operation and maintenance. It should also be manufacturable using predominantly semi-skilled labor and standard machine tools. Safe operation must be an essential consideration in your design.

20.2 Vehicle Configuration

The vehicle must have four (4) or more wheels not in a straight line. Three (3) wheeled vehicles are expressly prohibited from the competition. The vehicle must be capable of carrying one (1) person 190.3 cm (6 foot 3 inches) tall weighing 113.4 kg (250 lb).

20.2.1 Maximum Vehicle Dimensions

Width: 162.56 cm (64 in) at the widest point with the wheels pointing forward at static ride height.

Length**:** Unrestricted, but see note below.

NOTE: Teams should keep in mind that Mini Baja SAE courses are designed for vehicles with maximum dimensions of 64 in width by 108 in length.

20.3 All-Terrain Capability

The vehicle must be capable of safe operation over rough land terrain including obstructions such as rocks, sand, jumps, logs, steep inclines, mud and shallow water in any or all combinations and in any type of weather including rain, snow and ice. The vehicle must have adequate ground clearance and traction. Vehicles competing in Mini Baja East require flotation and water propulsion.

21. REQUIRED ENGINE

Briggs & Stratton 10 hp OHV Intek Model 205432 Type 0036-e1

For over twenty years, the Briggs & Stratton Corporation has generously provided engines to the Mini Baja teams without charge. Teams pay only $130 for shipping & handling of the required engines.

21.1 Engine Eligibility

Teams will be eligible to receive a new Briggs & Stratton engine in every second competition season in which they participate. Engines are allocated on the basis of one engine per vehicle per two seasons of participation.

Example 1: Teams that received a new Briggs and Stratton engine for the 2004 competition season and competed in Mini Baja event(s) in 2004 and 2005 will be eligible to receive a new engine for the 2006 competition season.

Example 2: A team that received a new engine in 2003, but did not compete in a Mini Baja event until 2004 and does not compete again until 2007, will only become eligible to receive an engine in 2008.

21.2 Eligible Teams - Receiving New Engines

Teams that are eligible to receive a new engine must complete the engine order form online at: **http://www.sae.org/students/student.htm.**

NOTE: The online engine order form is only accessible to registered teams.

Eligible teams will only pay the cost of shipping, $130.00 if the engine is shipped to a United States or Canada address.

21.2.1 Engine Shipment Outside the U.S. & Canada

SAE recommends that countries outside of the United States and Canada have their engines shipped:

(a) to the organizer of the competition they have registered and have it held for the team's arrival

or

(b) to an address in the United States.

If you choose to have your engine shipped to an address outside the United States or Canada, you must assume full responsibility for non-delivery of the engine or damage in transit. If, for any reason your engine fails to arrive, it will not be replaced. Additionally, your team will not be permitted to order an engine next year.

Shipping charges for engines shipped outside the United States or Canada are the responsibility of the ordering team and must be paid in advance by credit card.

Neither SAE nor Briggs & Stratton assume any responsibility for the delivery of engines.

NOTE: Teams requesting that engines be shipped to the organizer will be responsible for installing the engine prior to safety inspection and will need to bring the tools necessary to install the engine on-site.

21.3 Purchasing of Additional Briggs & Stratton Engines

Teams may purchase additional Briggs & Stratton Model 205432 Type 0036-el engines directly through a local Briggs & Stratton dealer. There is no special discount or preset purchase price for additional engines.

21.4 Engine Requirements and Restrictions

To provide a uniform basis for the performance events, all vehicles must use the same engine: a stock four cycle, 7.46 kw (10 horsepower), air cooled, Briggs & Stratton OHV Intek Model 205432 type 0036-e1 engine.

The engine **MUST** be a **Briggs & Stratton Model 205432 Type 0036-el**. No other model or type of engine may be used.

The required engine must remain completely stock in all ways, with the following qualifications:

NOTE: Blueprinting (reworking an engine to a manufacturer's exact specifications) is considered modification.

21.4.1 Replacement Parts

Briggs & Stratton Replacement Parts will be permitted.

21.4.2 Piston Rings

Piston ring end gaps may be increased if so desired. Only standard size original Briggs & Stratton piston rings may be used.

21.4.3 Intake Ports

No cleaning or removing of aluminum flashing from intake or exhaust ports.

21.4.4 Valves

(a)Valve Clearance

Any valve clearance setting between tappet and valve stem - intake and exhaust.

(b)Valve Lapping

Valves may be lapped-in to insure proper sealing. Intake angle must remain at 45 degrees; exhaust angle must remain at 45 degrees.

21.4.5 Shafts & Rods

Camshaft, crankshaft, connecting rod and flywheel must not be altered or modified.

21.4.6 Spark Plugs

Must use RC12YC ONLY.

21.4.7 Armature Air Gap

Any armature air gap setting.

21.4.8 Armature Mounting

No slotting or elongating of armature mounting holes to increase or retard ignition timing.

21.4.9 Flywheel Rotation

No flywheel rotation to advance or retard timing is permissible.

21.4.10 Carburetor

(a) Carburetor Re-jetting - Prohibited

This is a fixed carburetor, re-jetting of the carburetor is prohibited.

(b) Idle Speed

Any idle speed adjustment. Briggs & Stratton recommends 1750 +/- 100RPM.

(c) Carburetor Float

Carburetor float is non-adjustable and may not be re-adjusted.

(d) Carburetor Venturi

Modification of carburetor venturi is prohibited.

21.4.11 Air Cleaner

The air intake may be relocated, but you must use Briggs and Stratton parts to relocate the air filter: 492206 remote kit, 695329-choke shaft and 699960 base. The supplied air hose may be shortened; you may not use any other type of hose. A team may also add additional pre filters to the top of the air intake. These parts must be included on the cost report.) Any changes made to the air filter will have to pass Briggs and Stratton inspection.

NOTE from Briggs & Stratton: Relocation of the air cleaner may decrease engine performance.

21.4.12 Exhaust System

(a) Muffler

Original muffler must be used, but may be relocated. Tuned exhaust systems are prohibited. Briggs & Stratton is the only allowable muffler for use on the engine. All exhaust gas must pass through a single muffler. Multiple mufflers are not allowed.

(b) Muffler Relocation

If the car design requires an exhaust system reconfiguration to keep it from impinging on part of the car, the re-routing must be done using tubing having an ID of 1.25 in. Any remote mounted exhaust system must use the original muffler and must be securely mounted so that it does not vibrate loose during the competition.

(c) Muffler Support

Support of the exhaust pipe and muffler are strongly recommended.

(d) Exhaust Pipe

Exhaust pipe may not protrude inside of exhaust port so as to alter port configuration.

(e) Exhaust Pipe - Length

Any exhaust pipe length is allowed, however pipe length cannot be adjustable.

(f) Exhaust Pipe - Holes & Tubes

No extra holes or tubes are allowed in the exhaust pipe.

(g) Exhaust Pipe – Durability Required

The exhaust pipe and muffler must be completely intact and operational throughout the event, and shall be grounds for penalty or disqualification if not intact.

21.4.13 Starter Rope

Recoil starter rope may be extended to accommodate driver starting engine while seated.

21.4.14 Engine Governor

Each engine is equipped with a governor. Any attempt to defeat the engine governor so as to increase the engine speed will result in immediate disqualification. Before the performance events, each engine will be set to a maximum speed of 3800 rpm by means of the governor. Random inspection of the governor may be conducted at any time. GOVERNOR SETTING NOT TO EXCEED 3800 RPM!

NOTE: The governor spring must be placed in hole #6.

21.4.15 Fuel System

(a) Fuel Tank

The fuel tank supplied with the engine must be used, but may be relocated.

(b) Number of Fuel Tanks

Only one fuel tank is allowed.

21.4.16 Onboard Instrumentation/Data Acquisition

Onboard instrumentation/data acquisition is allowed; the power for this instrumentation must be from approved batteries. The batteries should be sealed and of the dry chemical type (e.g. alkaline) or gel type. In the event of a vehicle turnover or impact, there shall be no caustic battery fluid released. The intent of the batteries is to provide power only to the instrumentation. The combined power of the batteries should be less than 50 watts. If the instrumentation is to control transmissions, suspension elements or fuel flow, the power to alter these processes must come from the engine itself. The officials running the competition shall have final approval on any batteries used. Prior approval from the National Technical Inspectors on any battery used is recommended to avoid conflicts during the inspection at the competition.

NOTE: Ensure that the above items/systems, if utilized, are included in your team's cost report.

21.4.17 Spark Arrestor

A spark arrestor, Briggs & Stratton part number 399541, will be provided for each engine.

21.4.18 Storage Energy Devices Used for Propulsion

Hydraulic accumulators are the only type of stored energy device that may be incorporated into a Mini Baja vehicle for propulsion purposes. If employed, hydraulic accumulators must be at zero energy at the start of each event. Hydraulic power systems must be properly shielded and documentation of the shielding made available for review by the National Technical Inspectors.

Hybrid electric power systems are specifically prohibited.

21.5 Component Failure

In the event of a major component failure, any modifications must be approved by the National Technical Inspectors prior to the vehicle returning to the competition.

21.6 Engine Inspection

Briggs & Stratton engine service experts will be on-site during the competition and are empowered to inspect any engine at any time.

The Briggs and Stratton staff on site is empowered to make final decisions regarding the condition and set-up of all engines.

21.7 Engine Use Restriction

Briggs & Stratton generously provides engines to the teams for the exclusive purpose of use on their Mini Baja vehicle. If, for any reason, a team receives an engine and at a later date decides not to participate it must, at its own expense, return the engine to SAE International or Briggs & Stratton.

22. REVERSE LIGHT AND ALARM

Cars with reverse must have a back up light marked with an SAE "R" on the lens, be equal to, or exceed the SAE standard J759. The alarm must be rated per SAE standard J1741 or J994 that sounds when the vehicle is in reverse. An example of an acceptable backup alarm is #ZX814041B www.jcwhitney.com

23. TOWING HITCH POINT

Each vehicle must have towing hitch points at the front and rear, along its longitudinal centerline. When in use hitch plates must be rigidly affixed to the vehicle's main frame.

Adjustable/repositionable hitch plates are permitted.

NOTE: Towing hitch points are requirements for both competition events and vehicle recovery.

23.1 Front Hitch Point

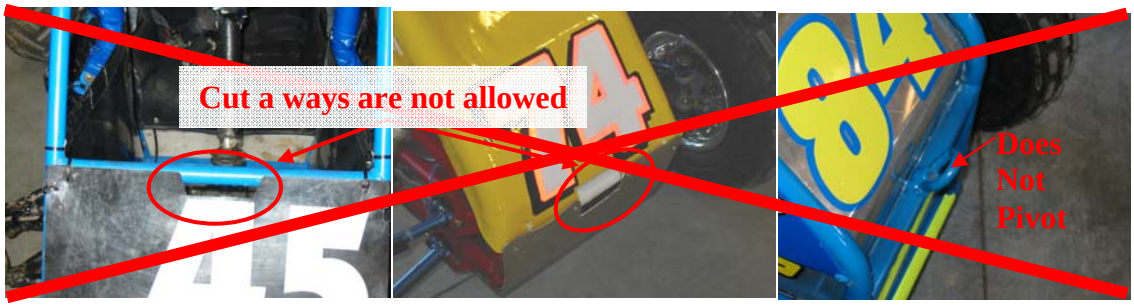
The front hitch point may be either:

(a) A tubular front bumper strong enough to lift the weight of the car with no permanent deformation and having a maximum outside diameter of 25.4 mm (1 in) to which a clevis can be centrally attached, or

(b) A hitch plate complying with the requirements of 23.3, which is designed to fold, or pivot, into a position where it will not affect anything during a front-end collision.

EXAMPLES OF ACCEPTABLE FRONT HITCHES

EXAMPLES OF FRONT HITCHES THAT ARE NOT ACCEPTABLE

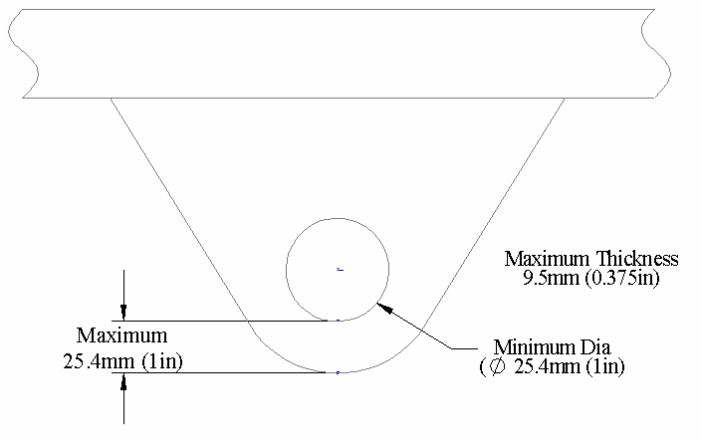


23.2 Rear Hitch Plate

The rear hitch point must be a plate complying with the requirements of 23.3.

23.3 Hitch Plate Requirements – Maximum and Minimum

Towing Plate **Maximum** Thickness 9.5 mm (0.375 in.)
Hole Diameter **Minimum**– 25.4 mm (1.0 in.)
Radial Clearance **Maximum** from hole – 25.4 mm (1.0in)



24. VEHICLE IDENTIFICATION

24.1 Number Assignment

North American competitions: Numbers are automatically assigned upon the completion of online registration. Assigned numbers may be found on the SAE Mini Baja website in the "registered team list" for each competition.

Non-North American: Vehicle numbers at Non- North America will be assigned by the respective organizers.

It is each team's responsibility to provide its vehicle numbers. The numbers must be clearly visible from both sides, the front and rear of the vehicle. Additionally the team must see that the numbers remain readable throughout the competition. If a vehicle's numbers are illegible then it may not be scored.

COMMENT: Schools that are entering more than one vehicle should consider painting them in individually distinctive colors to facilitate in lap counting.

24.2 Vehicle Number – Primary Cutout

Each vehicle must prominently display its number as either a silhouette or stencil form cutout. Clear and easily read numbers are essential for lap counting and vehicle identification. Cars with numbers that are hard to read, missing, damaged or obscured may not be scored and may be pulled in for repairs.

24.2.1 Number Location

These numbers must be affixed to the upper sides of the frame between the rear support and the rear roll hoop. The numbers must be in the vertical plane of the side of the car.

24.2.2 Number Size

The cutout numbers must be at least 203 mm (8 in) high.

COMMENT: Avoid having sharp edges or points on the outer sides of the cutout numbers.

24.3 Vehicle Number - Body

All vehicles must display their assigned number in block numerals on the front and both sides. These numbers must be at least 20.3 cm (8 inches) high, have a minimum line width of 2.54 cm (1 inch) and must strongly contrast with the background vehicle color.

24.4 School Name

All vehicles must display their school name or initials, in roman characters, if unique and generally recognized, on each side in characters at least 2.5 cm (1 inch) high.

Teams may also display their school name in non-roman characters provided that the roman character set is highest on the car.

24.5 Sponsor Logos

24.5.1 Briggs & Stratton Logo

Briggs & Stratton logos must be displayed in a prominent space on the front and each side of the vehicle. These will be distributed during registration at the event.

24.5.2 SAE Logo

Two (2) SAE logos must be displayed on the vehicle in prominent locations.

24.5.3 Sponsor Identification

Teams may display advertising from their vehicle's sponsors, provided it is in good taste and does not conflict with the vehicle's number. Organizers may require all entrants to display advertising from the event's sponsors.

25. TRANSPONDERS

25.1 Transponders – United States and Canadian Competitions

Transponders will be used as part of the primary timing system for all dynamic events run closed loop courses at competitions in the United States and Canada.

It is each team's responsibility to have a functional, properly mounted and fully charged transponder of the specified type on their vehicle. Vehicles without a specified transponder will **not** be allowed to compete in any event, for which a transponder is used for timing.

The use of transponders at competitions outside the United States and Canada is an organizer option. Check individual event website prior to the competition.

25.2 Transponder Requirement

All vehicles must be equipped with at least one AMB MX ($235.00) Rechargeable transpon
See: www.amb-it.com

The timing system is capable of recording two transponder identifications per vehicle; therefore, teams may, at their option, mount a second transponder as a backup in case the primary is damaged, knocked off the car or loses power.

25.2.1 Transponder Purchase

Note: To purchase transponders contact Balton Aulls from AMB directly at (678) 816 – 4000 ext 313, or use the following link:
http://www.amb-it.com/shop/amer/catalog/index.php?cPath=7_9
Balton will assist all teams with the purchase of transponders.

25.3 Transponder Mounting

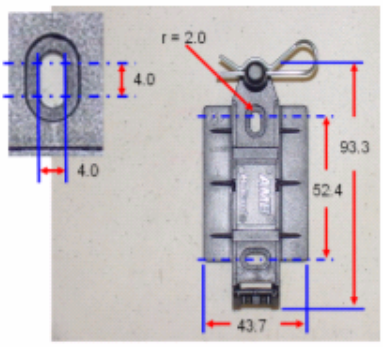
Each transponder is supplied with a mounting bracket (see photo). Teams are advised to weld a small plate to their frame to attach this bracket. The bracket can be attached with rivets, zip-ties or bolts. **Comment:** Attaching the bracket with M4 pan OR flat head bolts with lock nuts OR wire is strongly suggested.

The transponder mounting requirements are:

(1) Orientation - The bracket must be mounted vertical to the frame in the orientation shown in the photograph and orientated so the transponder number can be read "right-side up".
(2) Location – The transponder must be mounted on the driver's right side forward of the seat and preferably within the lower horizontal plane of the front suspension. The transponder must be no more than 61 cm (24 in) above the track.
(3) Unobstructed – There must be an open, unobstructed line between the antenna on the bottom of the transponder and the ground. (Do not mount the transponder inside the vehicle if sight line is obstructed.) Metal and carbon fiber may interrupt the transponder signal. The signal will normally transmit through fiberglass and plastic. If the signal will be obstructed by metal or carbon fiber, a 10.2 cm (4 in) diameter opening can be cut and the transponder mounted flush with the opening.
(4) Protection – Mount the transponder where it will be protected from obstacles.

Suggested Mounting Locations (Right Front of Vehicle)

Bracket Dimensions (mm)



25.4 Transponder Black Flag

If, for any reason, a car's transponder is not being received by the timing system then the car will be black flagged for transponder repair, relocation or replacement.

SECTION 3 ROLL CAGE, SYSTEMS AND DRIVER'S EQUIPMENT REQUIREMENTS

30. INTRODUCTION

The following design requirements apply to **all** Mini Baja competitions. (A few of the regulations may not pertain to all events. For example, the rules concerning deep water only apply to Mini Baja East.) The design and technical rules will be strictly enforced. It is the responsibility of each team to meet all technical requirements using sound engineering principles and construction done meeting proper fabrication procedures. Failure to do so may mean disqualification from the competition; final judgment rest with the National Technical inspectors. If you have any doubts about any technical requirement, present your questions, by email Mini_Bajarules@sae.org, to the National Technical Inspectors whom will make their best efforts to respond within 2 weeks.

30.1 Rules Requirements and Restrictions

30.1.1 Technical Inspection

All Mini Baja vehicles must pass a technical inspection before they are permitted to compete. Once a vehicle has passed technical inspection it must remain in "as approved" condition throughout the competition. Repairs must be made with identical parts.

30.1.2 Required Modifications

All installations and construction are subject to the approval of the technical inspectors, who may require modifications at their discretion. All competitors should be prepared to note these modifications during technical inspections.

30.1.3 Unstable Vehicles

Any vehicle exhibiting handling or other vehicle dynamics that are deemed unstable by the technical inspectors will not be permitted to participate in the dynamic events.

31. ROLL CAGE

31.1 Objective

The purpose of the roll cage is to provide a minimal three-dimensional space surrounding the driver. The cage must be designed and fabricated to prevent any failure of the cages integrity. The cage must be large enough for:

1.) The driver's helmet to be 15.24 cm (6 inches) away from a straightedge applied to any two points on the cockpit of the car, excluding the driver's seat and the rear driver safety supports.

2.) The driver's torso, knees, shoulders, elbows, hands, and arms must have a minimum of 7.62 cm (3 in) of clearance from the envelope created by the structure of the car. (This is tested by applying a straight-edged between any two points on the outside edges of the cockpit; which is defined by the outside edges of the roll cage members, less the roll cage padding.)

31.2 Roll Cage Requirements

31.2.1 Elements of the Roll Cage

The elements of the roll cage that must meet the material specification per 31.4 are:
Rear Roll Hoop (RRH) Rule 31.2.2
Lateral Diagonal Bracing (LDB) Rule 31.2.3
Roll Hoop Overhead members (RHO) Rule 31.2.4
Front Bracing members (FBM) Rule 31.2.7
Lateral Crossmember (LC) Rules 31.2.4 - 31.2.5

Additional required members must be steel and only have a minimum thickness of .89 mm (0.035 inch) and a minimum outside diameter of 2.54 cm (1.0 inch) and are as follows:
Lower Frame Side (LFS)
Side Impact Member (SIM)
Fore/Aft Bracing (FAB)
Front Lateral Crossmember (FLC)

Reference points: See drawings in this section.

NOTE: When minimal dimensions are given that is to the centerline of the members, and when a clearance for the driver is given , it is defined by the outside edges of the roll cage members less the padding installed.

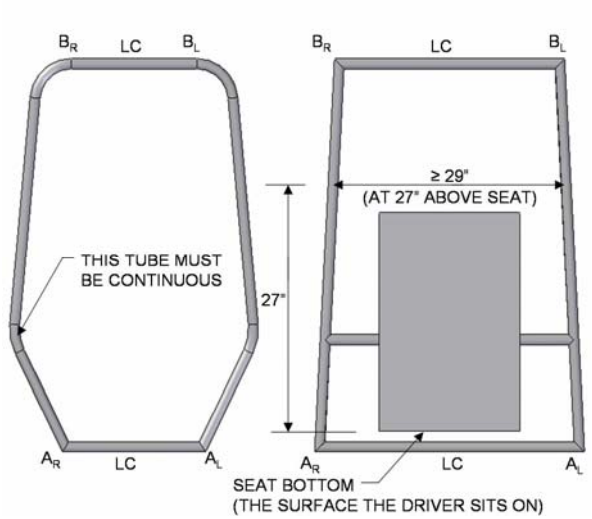
NOTE: All roll cage members having a bend radius > 15.2 cm (6 inches) may NOT be longer than 71.1cm (28 inches) unsupported.

DEFINITION - Driver - For the purposes of this section "driver" refers to the team's largest driver and the 95-percentile male properly suited and wearing a helmet.

31.2.2 Rear Roll Hoop (RRH)

A maximum of four sections, two LC at highest and lowest points, and two continuous, no break vertical members, make up the RRH, this may be one continuous hoop/tube. The driver's seat may not intrude into the plane(s) of the RRH. The upper junctions in straight-tube construction shall define points B_R and B_L. If bent-tube construction is used, points B_R and B_L will occur at the upper end of each bend. (*See RC1)* The RRH

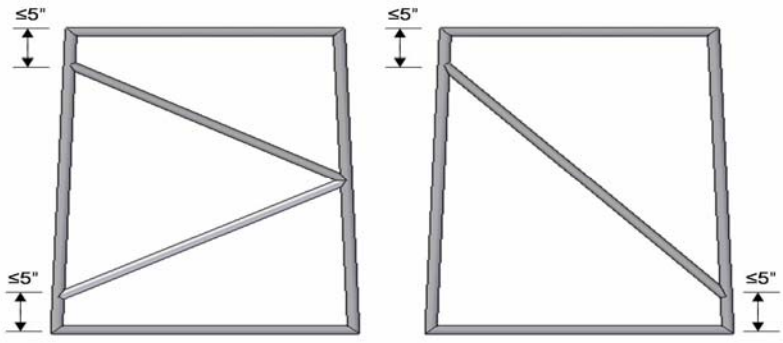
shall extend upward vertically +/-20 degrees from points A to points B. The RRH must also be a minimum of 73.6 cm (29 in) wide at 68.6 cm (27in) above the driver's seat, (Checked by a template).



RC 1

31.2.3 Rear Roll Hoop Lateral Diagonal Bracing (LDB)

Lateral bracing for the Rear Roll Hoop shall begin at a point along the vertical portion of the RRH within 12.7 cm (5 inches) vertically of point B_L or B_R and extend diagonally to a point no farther that 12.7 cm (5 inches) above point A_R or A_L respectively. *(See RC2)* The vertical angle between the RRH and the LDB must be no less than 20 degrees. Lateral bracing may consist of two or more members.

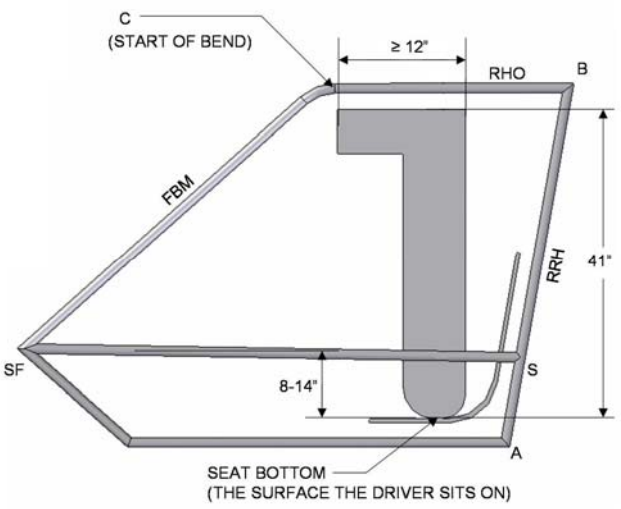


RC 2

Re: Sections 31.2.4 thru 31.2.7.2: It is understood that each definition requires a right side and a left side.

31.2.4 Roll Hoop Overhead members (RHO)

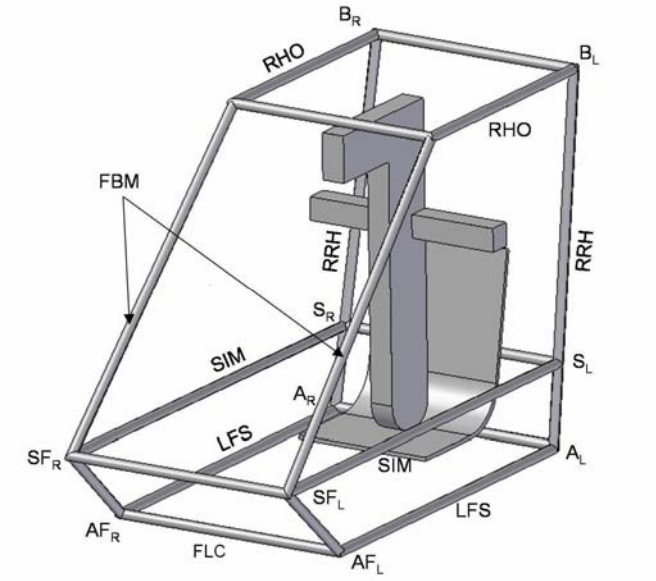
Roll Hoop Overhead members shall join the RRH within 5.1 cm (2 inches) vertically or laterally of points B and extend generally horizontally to points C. The RHO shall be located above the driver's seat by a minimum of 104.1 cm (41 inches). Points C should be located forward of the driver's seat by a minimum of 30.5 cm (12 inches) as defined in section 31.3. (*SeeRC3*) Points C_R and C_L shall be joined by a lateral crossmember (LC).



RC 3

31.2.5 Lower Frame Side members (LFS)

Lower frame side members shall join the RRH LC and extend forward to points forward of the driver's heel to a front lateral crossmember. (FLC) *(See RC4)*



RC 4

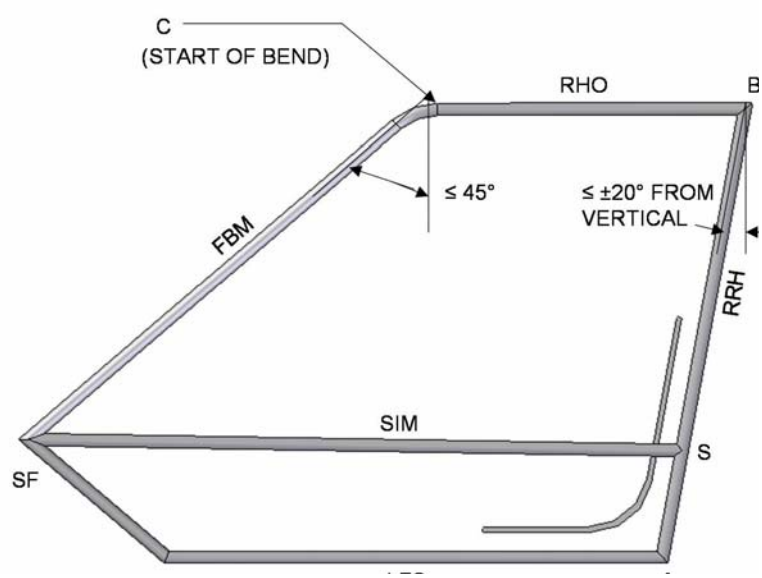
31.2.6 Side Impact members (SIM)

Side impact members shall join the RRH at points S and extend horizontally to points SF forward of the driver's toes. *(See RC4)* The SIM shall be between 20.3 cm (8 inches) and 35.6 cm (14 inches) (as measured vertically) above the area of the seat in contact with the driver.

NOTE: The driver's feet must be behind the plane created by points $AF_{R,L}$ and $SF_{R,L}$. If the tube between $SF_{R,L}$ is below the driver's toes then an additional bar will be required above the driver's toes. (The intent of this is to protect the driver's feet from a tire intrusion.)

31.2.7 Front Bracing members (FBM)

Front bracing members shall join the RHO, the SIM and the LFS. *(See RC5)* The upper Front Bracing members (FBM_{UP}) should extend downward and forward and join points C on the RHO to the SIM at or behind points SF. The angle between the FBM_{UP} and the vertical should be less than 45 degrees.



RC 5

31.2.8 Roll Hoop Bracing (FAB)

The roll hoop can be braced in **the front and/or rear.** The hoop must be braced on both right and left sides. From a side view, the bracing must be triangulated, with the maximum length of any member not to exceed 101.6 cm (40 inches) between attachment points. A bent tube cannot exceed 81.3 cm (32 inches) between attachment points.

31.2.8.1 Front Bracing

If front bracing is used it must connect FBMup, LFS and the SIM. Front bracing must be attached as close as possible to the top of the roll cage (point C).

31.2.8.2 Rear Bracing

If rear bracing is used it must be attached as close as possible to the top of the roll hoop along the outer perimeter. The bracing must be triangulated and connect back to the RRH below the SIM.

31.2.9 Final Judgment

The rules are considered a minimum but the final judgment will rest with the National Technical Inspectors. If during the event, any frame shows signs of yield and/or failure the car will be removed from competition until the technical inspectors confirm that the frame complies with the rules again.

COMMENT: Note that in all cases, especially bent-tube construction, technical inspectors may require additional bracing if they feel the roll cage does not offer adequate protection. Any tubes showing cracks and deformation **do not** comply with the rules.

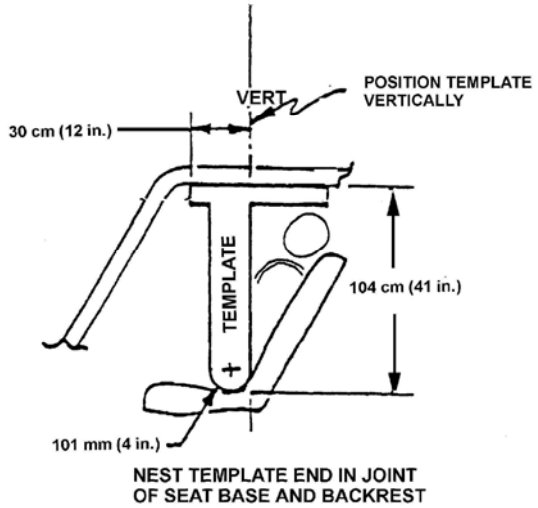
31.3 Driver Head Clearance

For driver head clearance, the roll cage must extend a minimum of 104.1 cm (41 inches) above the seating surface to the bottom of the upper roll cage tubes measured vertically using the Template in Figure 1. The template radiuses bottom should be placed in the joint of the seat base and the seat backrest and positioned vertically. The template "tee" top describes the projection of the required clearance height forward and rearward. While the template fixes the clearance height forward, the clearance height rearward must be extended in each design over the helmet top of a seated and secured driver. Taller drivers may be accommodated by lengthening the template vertical member and raising the entire clearance height envelope above the 104.1 cm (41 inches) minimum. In all cases, a minimum of 15.2 cm (6 inches) vertical clearance must be provided from the helmet top of the team's tallest driver to the bottom of the roll cage top tubes or members.

31.3.1 Head Clearance - Minimum

In all cases, a minimum of 15.2 cm (6 inches) vertical clearance must be provided from the helmet top of the team's tallest driver to the bottom of the roll cage top tubes or members.

FIGURE 1



31.4 Roll Cage & Bracing Materials

The material used for the entire required roll cage members specified in 31.2.1 must, at minimum, be:

(a) Circular steel tubing with an outside diameter of 2.5 cm (1 inch) and a wall thickness of 3.05mm (0.120 inch) and a carbon content of at least 0.18.

Or

(b) Steel members with at least equal bending stiffness and bending strength to 1018 steel having a circular cross section with a 2.5 cm (1 inch) OD and a wall thickness of 3.05 mm (0.120 inch).

NOTE: The use of alloy steel does not allow the wall thickness to be thinner than 1.65mm (.065inch)

The bending stiffness and bending strength have to be calculated about an axis that gives the lowest value. Bending stiffness is proportional by the EI product and bending strength is given by the value of SyI/c, (for 1018 steel the values are; S_y= 370 Mpa (53.7 ksi) E=205 GPa (29,700 ksi).

E = the modulus of elasticity

I = the second moment of area for the cross section about the axis giving the lowest value

Sy = the yield strength of material in units of force per unit area

c = the distance from the neutral axis to the extreme fiber

31.4.1 Roll Cage Specification Sheet - Required

All teams must bring a copy of the SAE Mini Baja® Roll Cage Specification Sheet (See Section 8 “Forms & Deadlines”) to the National Technical Inspectors during technical inspection. These forms must be completed for each competition. Complete roll cage specifications must be supplied with the Roll Cage Specification Sheet. Teams that do not submit a Roll Cage Specification Sheet will not be allowed to compete.

31.4.2 Roll Cage Padding

Any portion of the roll bar, roll bar bracing, SIM, or frame (excluding RRH) between the weld joints which would be contacted by the driver, must be covered by a non - resilient material such as Ethafoam® or Ensolite® or other similar material, with a minimum thickness of 1.2 cm (0.5 inch). All welded joints must be clear of padding for 2.5 cm (1 in) along each tube to permit inspection of the weld.

31.4.3 Head Restraint

A head restraint must be provided on the car to limit rearward motion of the head in case of an accident. The restraint must have a minimum area of 232 sq. cm (36 sq. inches), be padded, with a non-resilient, energy absorbing material such as Ethafoam® or Ensolite®. There must be a minimum thickness of 3.8 cm (1.5 inches), and be located no more than 2.5 cm (1 inch) away from the helmet in the uncompressed state. The head restraint **must** meet the above requirements for all drivers.

31.4.3.1 Inspection Holes

The National Technical Inspectors will instruct the students where to drill two 4.5mm (.18 inch) diameter holes during initial tech inspection.

31.4.4 Sharp Edges on Roll Cage - Prohibited

All sharp edges which might endanger the driver, crew, officials and safety staff must be eliminated by radiusing, shielding and/or padding. This includes brackets, gussets, sheet stock, fastener ends, clamps, "ty-raps" or other features accessible during servicing, judging or competition impact or roll over.

31.4.5 Materials - Documentation

Teams are required to bring with them to Technical Inspection documentation (invoices, bills, etc.) of the materials used in the roll cage and bracing.

31.5 Bolted Roll Cages

Bolted roll cages are acceptable only if the following requirements are met

(a) Flanges or tabs must be twice (2X) the thickness of the tube structures, made of the same material type. They must be properly welded to each tubing part to be joined

(b) Flange mounts must be twice (2X) the diameter of the attached tubing, flush mated, with no gap between the faces greater than 0.07 mm (0.003) inches

(c) Tab mounts must be dual, parallel and on each side of the tubing to which they are welded, having a welded length of at least twice (2X) the diameter of the adjoined. Tubing held by bolt must be reinforced such that the area through which the bolt passes cannot be compressed from tightening or impact.

32. COCKPIT

32.1 Design Objective

The cockpit must be designed to (1) protect the specified driver clearances and (2) permit easy driver exit in an emergency.

32.2 Driver Exit Time

All drivers must be able to exit on either side of the vehicle within five (5) seconds.

Exit time begins with the driver in the fully seated position, hands in driving position on the connected steering wheel, and wearing the required driver equipment. Exit time will stop when the driver has both feet on the ground. Driver's exit time must be demonstrated by a team driver, or drivers selected by the technical inspectors.

32.3 Firewall

A firewall between the cockpit and the engine and fuel tank compartment is mandatory, it must cover the area between the lower and upper LC. This firewall must be metal, at least 0.508 mm (0.020 inches) thick, and must completely separate the engine compartment and fuel tank from

the cockpit. Cutouts for the pull starter will be allowed, only if their design meets sidewall standards.

32.3.1 Front or Mid-engine Cars

If the engine is not placed in the rear of car then it must meet the following standards:

(a) Gas tank must be in a sealed container that prevents fuel from leaking in the event of gas tank failure.

(b) Splash shields must prevent fuel from being poured anywhere in the cockpit area during fueling. (See rule 35.4 “Spill Prevention)

(c) Engine must be completely enclosed and protect the driver in the event of a engine

failure, shielding must meet guarding requirements (See rule 38.1 “Powertrain Guards”).

(d) Driver must be able to still egress from either side of the vehicle.

(e) The exhaust must not exit towards the driver and must be shielded.

32.4 Body Panels

The cockpit must be fitted with body panels that cover the area between the lower frame side member and the side impact member. These panels must be made of plastic, fiberglass, metal or similar material. They must be designed to prevent debris and foreign object intrusion into the driver compartment. Expanded metal, fabric, or perforated panels are not allowed.

32.5 Leg and Foot Shielding

All steering or suspension links exposed in the cockpit must be shielded such that the driver’s legs and feet cannot contact, or become entangled in them. The driver’s feet must be completely within the roll cage.

32.6 Kill Switches

Each vehicle must be equipped with two (2) easily accessible kill switches turning off the ignition and entire electrical system of the car.

32.6.1 Kill Switch – Type

The kill switch must be one of the following:

a.) 01-171 Ski-Doo kill switch available at

http://www.mfgsupply.com/m/c/01-171.html?id=UxSI4Vzn

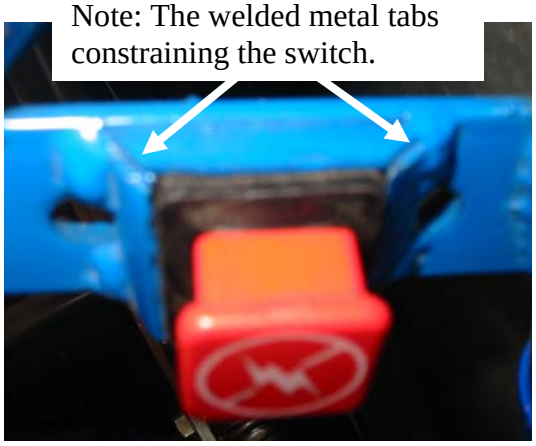
b.) After Market WPS# 27-0152 or 27-0124

http://www.parkeryamaha.com/index.asp?PageAction=PRODSEARCH&txtSearch=27-0152&Page=1

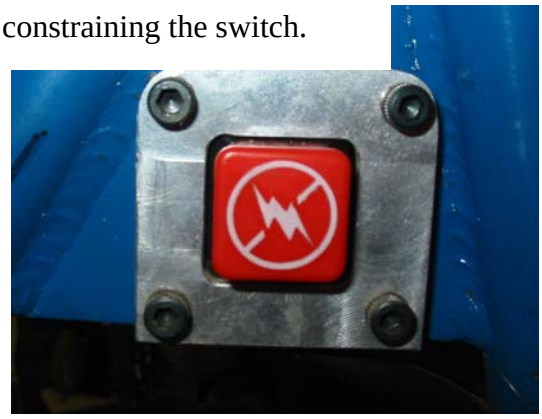
c.) A Stock Polaris # 4110106
(See figure below for example)

Sample Mountings (Note: The kill switches need to be mounted using the outer case. If they are mounted using adhesive on the back cover the switch will fail.)

Note: The welded metal tabs constraining the switch.



Note: The machined block constraining the switch.



32.6.2 Kill Switch – Locations and Orientation

(a) Cockpit Switch – The cockpit switch must be located in the front of the cockpit within easy reach of the driver when strapped into the seat. The switch may not be mounted on a removable steering wheel assembly.

(b) External Switch – The external switch must be mounted on the driver's right side of the vehicle, on a panel between RRH and Rear Bracing within the red area, and behind the plane of the main roll hoop (see figure). The switch must be within easy reach of track workers. The external switch must be oriented with "run" in the out position and "kill" in the in position. The switch must be mounted rigidly, with no sharp edges in that area.

32.6.3 Kill Switch – Wiring

All wiring to kill switches **must be** sealed, protected or securely attached to the frame to prevent the wires from being entangled with the driver or obstacles. Sound engineering practices must be used.

32.7 Fire Extinguisher – Size and Location

Each vehicle must have two identical fire extinguishers with a minimum UL rating of 5 B-C. One must be mounted in the cockpit below driver's head, with the top half above the side impact member on the right side of the firewall and be easily accessible by course workers. The fire extinguisher cannot be mounted behind or inside of the body panels. Mountings must be designed to resist shaking loose over rough terrain, while allowing the course workers to remove it easily if necessary. The second must be brought to technical inspection with mounting accessories; it will be used as a replacement if needed. All fire extinguishers must be equipped with a manufacturer installed dial pressure; the gauge must be readable by the National Technical Inspectors. Fire extinguishers **must** be labeled with school name and vehicle number.

32.8 Throttle

Only foot operated throttle controls are allowed. A wide-open throttle stop must be mounted at the pedal. Mechanical, hydraulic or other throttle controls must be designed to return to idle-stop in the event of a failure. Foot pedals must be positioned so as to avoid foot entrapment in any position.

32.8.1 Throttle Extensions

Teams may not add any type of extension to either the control surfaces or to the driver in order to operate the vehicle. For example, drivers may not add blocks of wood to their feet so that they can reach the controls of the vehicle.

33. DRIVER RESTRAINT

33.1 Minimum Four Strap System Required

A minimum of a four (4) strap restraint system consisting of a lap belt and two over-the-shoulder belts is mandatory. Each shoulder strap must be joined to the cage with its own bolt or a strap looped around the cage member and cinched with an appropriate adjuster buckle if provided as such by the manufacturer. Means must be provided to maintain the lateral position of the looped strap. "Y" type harnesses in which a single strap becomes two over-the-shoulder straps are not allowed. All belts must meet SFI specification 16.1, and must be in good condition. Areas through which the belts pass must be grommetted to prevent chafing.

33.1.1 Release Mechanism

All belts must join with a single metal-to-metal quick release lever type buckle. No camlock systems are allowed.

33.1.2 Safety Harness Expiration

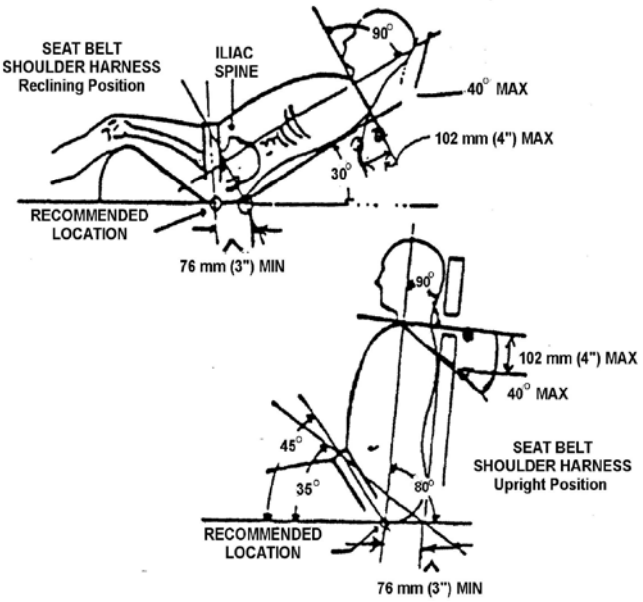
Safety belts can be no older than 3 years, as indicated by the dates on the belts.

33.2 Harness Attachment Points

The harness attachment points must be designed in accordance with sound engineering practice. All attachments must be to the frame and not to the seat.

33.3 Lap Belt

The lap belt must be worn in such a manner that it passes around the pelvic area at a point below the anterior superior iliac spines. Under **NO** circumstances may it be worn over the area of the intestines and abdomen. The harness attachment points must be designed in accordance with the following figures, "Harness Attachment Points."



Harness Attachment Points

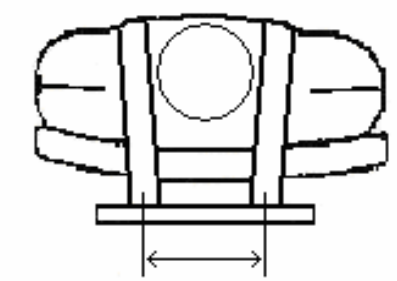
33.4 Shoulder Belts

33.4.1 Vertical Location

The shoulder belts must **NOT** be mounted above the shoulder level, and must be mounted forward of the firewall. Shoulder belts must be no more than 102 mm (4 in.) below the perpendicular from the spine to the seat back at the shoulder level.

33.4.2 Horizontal Location

The mounting points shall be separated by 17.78 cm (7 inches) +/- (plus or minus) 25.4 mm (1 inch) center to center. The mounting points must use sound engineering practices. The straps shall not pass through anything that will cause the center distance to be less than 15.24 cm (6 inches) from center to center of the strap. The straps shall not pass over anything that causes them to be more than 20.32mm (8 inches) apart center to center.



152 mm (6”) min
203 mm (8”) max

33.5 Belts

When adjusted, no part of the belt must project beyond the cockpit area, and must not come into contact with rotating components of the chassis, or terrain features. Loose ends of the belt must be restrained, but must not be wrapped around the buckle in a such a manner as to prevent proper operation. Both the largest and smallest drivers on a team must meet these restraint requirements.

The shoulder belt adjusters/buckles must be adjusted so that they are sufficiently clear of the webbing to permit further tightening by the safety officials.

NOTE: If the belts do not have enough adjustment capacity the vehicle will be pulled from the competition until the matter is corrected.

33.6 Arm Restraints

In the event of a rollover, the driver’s arms must be kept within the limits of the cockpit. The cockpit is defined as the roll cage sides and the planes defined by the roll hoop overhead members and the side impact members.

Arm restraints must be securely fastened to the driver restraint system.

Only commercially available arm restraints meeting SFI 3.3 are allowed.

33.6.1 Arm Restraint – Installation

Arm restraints must installed such that the driver can release them and exit the vehicle unassisted regardless of the vehicle’s position. The arm restraint must be worn by the driver on the forearm just below the elbow. The drivers must be able to reach the cockpit kill switch, and steering wheel but not allow their arms to exit the cockpit.

33.6.2 Arm Restrain – Expiration

Arm restraints can be no older than 3 years, as indicated by the dates on the belts.

33.7 Installations - General

All installations must prevent accidental unfastening from either a direct pull, rollover or slide along the side.

34. BRAKING SYSTEM

34.1 Foot Brake

The car must be equipped with a hydraulic braking system that acts on all wheels and is operated by a single foot. The brake system must be capable of locking ALL FOUR wheels in a static condition and dynamically on pavement or an unpaved surface.

34.2 Independent Brake Circuits

The vehicle must be have at least two (2) independent hydraulic systems such that in case of a leak or failure at any point in the system, effective braking power shall be maintained on at least two wheels. Each hydraulic system shall have its own fluid reserve either through separate reservoirs or by the use of a dammed, OEM-style reservoir.

34.3 Brake Light

The vehicle must be equipped with a brake light marked with an SAE “S” or “U” rating on the lens or if it is not rated as per SAE J759, it must be equal to or exceed these standards. Teams must provide documentation to verify that the light meets the required standards. The determination of whether or not a brake light meets the required standards rests with the National Technical Inspectors.

The brake light must be independent of the kill switch and remain operable at all times.

34.4 Brake(s) Location

The brake(s) on the driven axle must operate through the final drive. Inboard braking through universal joints is permitted. Braking on a jackshaft or through an intermediate reduction stage is prohibited.

34.5 Cutting Brakes

Hand or feet operated “cutting brakes” are permitted provided section 34.1”Foot Brake” is also satisfied.

35. FUEL SYSTEM & FUEL

35.1 System Location

The entire fuel system must be located within the roll cage envelope such that it is protected from impact. The tank mountings must be designed to resist shaking loose.

35.2 Fuel Tank

Only a single fuel tank is permitted. Fuel tanks are restricted to the stock tank provided by Briggs & Stratton.

35.2.1 Fuel Tank Vent

A check valve in the fuel cap that prevents fuel from leaking in a rollover or the car being on its side is required. The check valve must be completely sealed to the cap.

Note: Vent lines out of the tank are **no** longer allowed. Teams **cannot** add any additional hole to the stock tank.

35.3 Fuel Lines

All fuel lines must be located away from sharp edges, hot engine components and be protected from chafing. Grommetting is required where the lines pass through any member of the vehicle. Fuel lines are not allowed in the cockpit.

All lines must be attached securely and be SAE rated fuel lines, no larger than the stock lines supplied with the engine (i.e. ½" O.D. and ¼" I.D.). If a fuel filter is used, it must be a Briggs and Stratton stock filter.

35.4 Spill Prevention

The fuel tank must be mounted so that no fuel can be spilled on the driver, engine, ignition or exhaust during fueling. Complying with this rule will require a drip pan that is at least 203.2 mm (8inches) in diameter or equivalent area and have sides of at least 38.1 mm (1.5 inches) high. The drip pan cannot be mounted straight to the tank around the fuel cap the fuel must drain from the pan through a tube to the bottom of the car (no pooling of the fuel allowed).

35.4.1 Splash Shields

Splash shields are required to prevent fuel from directly being poured on the engine or exhaust; while refueling or preparing to refuel the car.

Note: The following is an example of approved spill/splash shields:

The following is **NOT** acceptable:

35.4.2 Filler Cap

The standard Briggs and Stratton caps do not prevent fuel from leaking in the event of a rollover. The gasket inside the cap must be replaced with a gasket that does not breakdown in fuel, does not have any holes and prevents fuel from spilling. The cap must not come loose during dynamic events or allow fuel to spill out.

35.5 Fuel

The only fuel permitted is a grade of automotive gasoline consisting of hydrocarbon compounds. The gasoline may contain anti-oxidants, metal deactivators, corrosion inhibitors, or lead alkyl compounds such as tetra-ethyl lead. The addition of nitrogen bearing additives, or additives designed to liberate oxygen is strictly prohibited.

Specific gravity should not exceed 0.75 for leaded gasoline or 0.80 for unleaded gasoline when measured at 60 degrees Fahrenheit. See Section 41.4 “Competition Fuel Supply.”

35.6 Fuel Containers

All fuel must be carried in, and put into vehicle fuel tanks, from DOT approved containers.

36. STEERING, SUSPENSION AND FLOATATION SYSTEMS

36.1 Wheel Stops

All vehicles must be equipped with positive wheel lock-to-lock stops. These stops must be located at the wheel kingpins and behind the centerline of the wheel. Wheel stops must function at full jounce, full rebound and all points in between. No straps or cables are allowed.

36.2 Tie Rod Protection

The tie rods of all vehicles must be protected from frontal impact. A bumper may be required, at the technical inspector’s discretion, depending on the design and installation.

36.3 Adjustable Tie Rod Ends

Adjustable tie rod ends must be constrained with a jam nut to prevent loosening.

36.4 Flotation Systems – MINI BAJA EAST ONLY

Vehicles participating in water events must possess static stability in roll and pitch while floating.

36.5 Inclining Test – MINI BAJA EAST ONLY

Vehicles must demonstrate, in an Inclining Test, a range of static roll stability of at least 30 degrees (i.e., recover to upright from a 30 degree induced roll angle) with the team’s heaviest driver seated in the normal driving position. Vehicles which may flood at any roll angle up to 90 degrees must pass the Inclining Test while in a fully flooded condition. Vehicles may not participate in water events until they have passed the Inclining Test.

37. FASTENERS

37.1 Locking Requirements

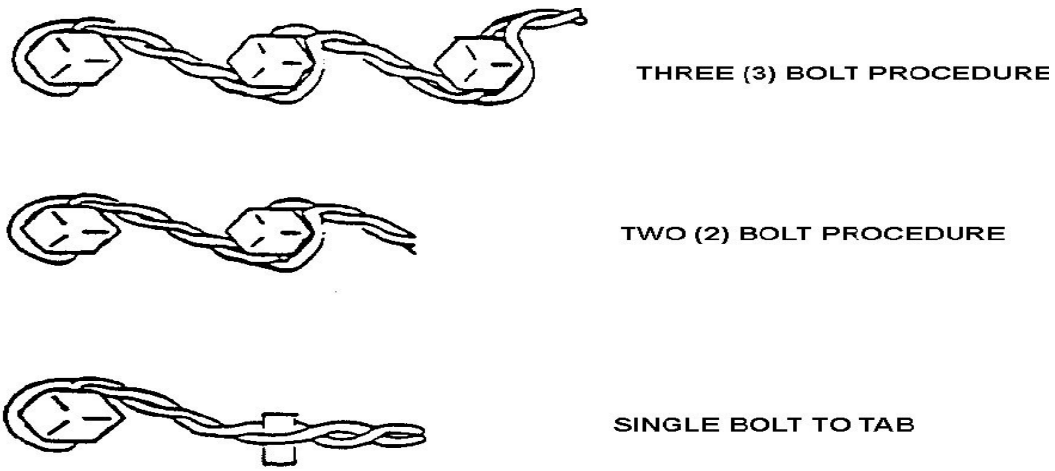
All threaded fasteners in the steering, suspension, braking (caliper & master cylinder mounting and non OEM rotors & hubs system) and driver restraint systems must be captive. This is defined as requiring **NYLON locknuts**, cottered nuts or safety wired bolts (in blind applications). Lock washers or thread sealant do not meet this requirement.

EXAMPLE: A team using a custom hub with an OEM rotor must meet the locking

requirements, but a team using an OEM hub and OEM rotor would be exempt.

The following figure illustrates the procedure for using lock wire:

Lock Wire Procedure Detail



A. Above illustrations assume right hand threads.
B. No more than three (3) bolts may be safe-tied together.
C. Bolt heads may be safe-tied as shown only when the female thread receiver is captive, or the nuts meet previous lock nut requirements.
D. Nuts (pre-drilled) may be safe-tied in similar fashion to the illustrations with the following conditions:

1. Nuts are heat treated.
2. Nuts are "factory drilled" for use with lock wire.

E. Lock wire MUST fill a minimum of 75% of the drilled hole provided for the use of lock wire.
F. Lock wire must be aircraft quality stainless steel of 0.020" Dia., 0.032" Dia., or 0.042" Dia. Diameter of lock wire is determined by the thread size of the fastener to be satisfied:

1. Thread sizes of ¼" and smaller use 0.020" wire.
2. Thread sized of ¼" to ½" use 0.032" wire.
3. Thread sizes > ½" use 0.042" wire.
4. The larger wire may be used in smaller bolts in cases of convenience, but smaller wire must not be used in larger fastener sizes.

37.2 Fastener Grade Requirements

All bolts used in the systems designated in Section 37.1 must meet SAE grade 5, metric grade M8.8 or AN military specifications. See Figure below, "Bolt Head Markings." Any threaded

IDENTIFICATION OF SAE BOLT GRADES: HEAD MARKINGS

Grade 0.1. and 2. no marking

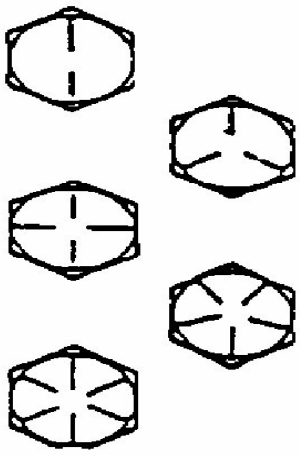
Grade 3: 2 radial dashes 180° apart

Grade 5: 3 radial dashes 120° apart

Grade 6: 4 radial dashes 90° apart

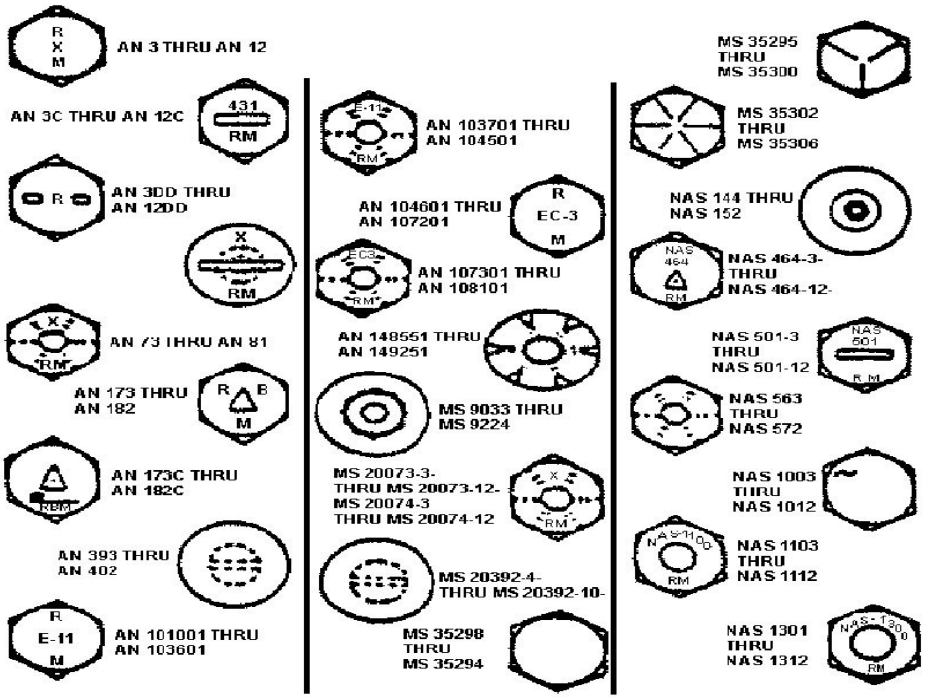
Grade 7: 5 radial dashes 72° apart

Grade 8:6 radial dashes 60° apart



fastener components not shown in Figure below (including threaded rod) must have supporting documentation. (For example, stock drivetrains, suspension components, steering and braking or driver restraint systems.)

Acceptable Military Specification Bolt Grades:



37.3 Thread Exposure

All threaded fasteners must have at least two (2) threads showing past the nut.

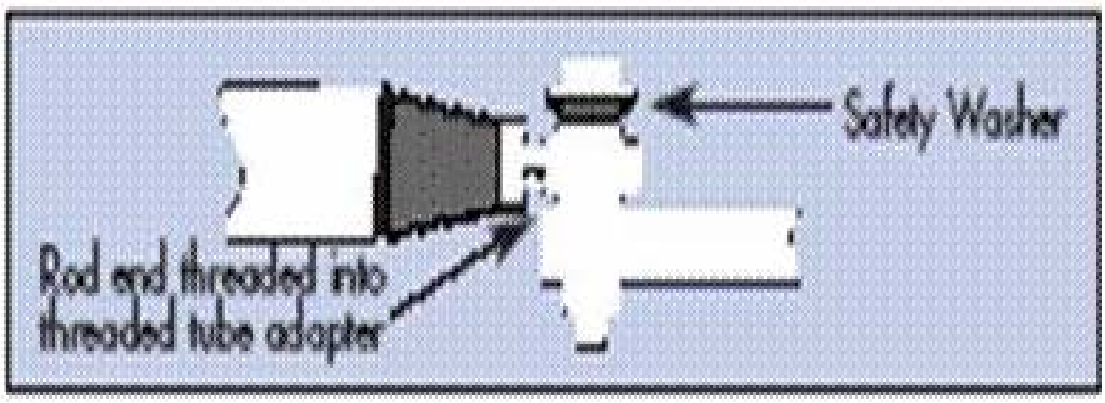
37.4 Single Shear Connections

All tie rods in single shear must have a factory steel safetly washer. Ball joints are the **only** exception. (See 37.4.2)

37.4.1 Tie Rods

All tie rods in single shear must have a factory steel safety washer.

Factory Safety washers are available at www.chassisshop.com



37.4.2 Ball Joints

Any commercially manufactured ball joints or rod ends with studs are allowed. Student manufactured ball joints or rod ends with studs are specifically prohibited.

38. GUARDS

38.1 Powertrain Guards

All rotating parts such as belts, chains, and sprockets that rotate at the rate of the drive axle(s) or faster must be shielded to prevent injury to the driver or bystanders should the component fly apart due to centrifugal force. These guards/shields must extend around the periphery over any area that is in-line toward the driver, bystanders, fuel tank, or fuel lines. At static ride height if

the guards come with in 30.4 cm (12inches) of the ground then the guard must only pass the centerline of the rotating part. They must be mounted with sound engineering practice, to resist vibration. They must be either **(a)** made of 1010 steel at least 1.524 mm (0.06 inch) thick or **(b)** a material having equivalent energy absorption at rupture, per unit width of shield.

NO POLYCARBONATE MATERIALS ARE ALLOWED (i.e. Lexan)

38.2 Factory Stock Guards

Factory stock guards must be demonstrated to be equal to those described in 38.1.

38.3 Propeller Guards

Propellers, if used for water propulsion, must be located or shrouded so that direct contact with the propellers is not possible.

39. DRIVER EQUIPMENT REQUIREMENTS

39.1 Helmet, Neck Support/Collar & Goggles

All driver's must wear a well-fitting Motor-Cross style helmet with an integrated (one piece composite shell) chin/face guard and a Snell M2000, SA2000, or British Standards Institution BS 6658-85 types A or A/FR rating. Goggles must incorporate the use of tear-offs or roll-off systems

MOTOR-CROSS STYLE

NO STREET BIKE STYLE HELMETS

In addition to the helmet, a neck support/collar must be worn. The neck support must be a full circle (360˚) and SFI 3.3 rated not a horseshoe collar. (See figure) Simpson, RCI, GForce, Deist or Leaf Racing Products supply neck collars that meet this requirement. Neck braces can be no older than 3 years old, as indicated by the dates on the brace.

http://www.simpsonracing.com
http://www.deist.com
Error! Hyperlink reference not valid.
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WARNING: Some Motor-Cross helmets have extended chin guards that will not contact the required neck collars when the head is flexed forward. This combination of helmet/collar system is prohibited.

Any non-specification helmets will be confiscated until after the competition. This rule has no exceptions and it will be strictly enforced. Helmets certified to other rating systems may not be worn.

39.2 Clothing

Driver's must wear appropriate clothing, including long pants(cotton/Nomex), socks, shoes, gloves, and a long sleeved SFI rated upper garment.

39.3 Life Jacket Required – MINI BAJA SAE EAST ONLY

For deep water events, each driver must wear a U.S. Coast Guard approved Type III life jacket.

AN EXAMPLE OF TYPE III LIFE JACKET, OTHERWISE KNOW AS A WATERSPORTS VEST

SECTION 4 COMPETITION PROCEDURES AND REGULATIONS

40. RULES CLARIFICATION AND PROTESTS

40.1 Technical Questions

Questions about the rules requirements and restrictions must be submitted by e-mail to the National Technical Inspectors of the Mini Baja SAE competitions. Only the National Technical Inspectors are authorized to interpret the technical sections of the rules. Technical questions are to be emailed to the National Technical Inspectors at: **Bajarules@sae.org**. Questions and answers will be posted on the National Technical Inspectors website at: **http://www.sae.org/students/mbtechinspect.htm.**

Teams are advised that the technical inspector approval of any vehicle, including those constructed based on responses to rules questions, is contingent on the proper fabrication of the vehicle and its design as an integrated unit.

NOTE: Please keep in mind that final operating approval of a Mini Baja SAE vehicle can only be given at the competition by the National Technical Inspectors.

40.2 Event Related Questions

Questions pertaining to the operation and schedules of specific Mini Baja competitions should be emailed to the respective organizers at the addresses given in the appendix.

40.3 Protests

It is recognized that hundreds of hours of work have gone into fielding a vehicle. In the heat of competition, emotions peak and disputes can arise. The organizers and SAE staff will make every effort to fully review all questions and resolve problems quickly and equitably.

40.3.1 Preliminary Review - Required

If a team has a question about scoring, judging, policies or any official action it must be brought to the organizer's or SAE staff's attention for an informal preliminary review before a protest can be filed.

40.3.2 Cause for Protest

A team may protest any rule interpretation, score or official action (unless specifically excluded from protest) which they feel has caused some actual, non-trivial, harm to their team, or has had a substantive effect on their score. Teams may not protest rule interpretations or actions that have not caused them any substantive damage.

40.3.3 Protest Format and Forfeit

All protests must be filed in writing and presented to the organizer or SAE staff by the faculty advisor or team captain. In order to have a protest considered, a team must post a twenty-five (25) point protest bond which will be forfeited if their protest is rejected.

40.3.4 Protest Period

Protests concerning any aspect of the competition must be filed within one hour (60 minutes) of the end of the event to which the protest relates.

40.3.5 Decision

The decision of the competition protest committee or National Technical Inspectors regarding any protest is final.

41. COMPETITION PROCEDURES AND REGULATION - GENERAL

41.1 Drivers Meetings

All team members identified as drivers and their support personnel **MUST** attend all drivers meetings. Attendance at drivers meeting is mandatory. Failure to attend drivers meetings can result in disqualification of members or the entire team.

41.2 Pre-inspection Operation Prohibited

Except as required as part of the inspection process itself, vehicles may not be started or driven prior to passing safety inspection.

41.3 Governor Setting

Briggs & Stratton Technical Representatives will set the governors of all vehicles.

Vehicles must be presented for governor setting with (1) the drivetrain disconnected and (2) the engine shaft clear. SAE Mini Baja SAE Officials may order a recheck of the governor setting of any vehicle at any time.

41.4 Competition Fuel Supply

Fuel at the competition will either (1) be provided by the organizers or (2) the organizers will specify acceptable fuel providers.

41.4.1 Refueling

All refueling of the cars done in the pit area or on the course must be done with (1) the engine shut-off and (2) the driver out of the car. Any violations of this rule will be subjected to severe penalties. A fire extinguisher must be on hand whenever a vehicle is being refueled.

41.5 Post Endurance Inspection

At the end of the endurance event, the top ten (10) vehicles will be impounded. Some or all of these vehicles will be inspected. Any vehicle found to have a modified engine will be disqualified from the entire competition. The organizers reserve the right to impound and inspect any vehicle.

No one except technical inspectors and officials are permitted in the impound area without specific authorization from the organizers. **NO EXCEPTIONS**.

41.6 Engine Recall Option

The organizers and SAE may, at their sole option, recall the engine from any vehicle in the competition in exchange for a new Briggs and Stratton engine. Recalled engines will not be returned and will be inspected at Briggs and Stratton's facilities to confirm compliance with the

rules.

41.7 Pit Rules

41.7.1 Vehicle Movement – Walking Pace Required

When a vehicle is driven anywhere except the practice area or competition events, it must move at walking speed with a team member walking along side at a normal pace. During the performance events when the excitement is high, it is particularly important that vehicles be moved at a walking pace in the pits. The walking speed rule will be strictly enforced and point penalties will be assessed for violations.

Under no circumstances may anyone other than the driver ride on a vehicle.

41.7.2 Team Work Area

The team's work area should be clearly defined and should be kept uncluttered at all times. When a team leaves their area, it must be left clean.

41.7.3 Vehicles in the Pits

Only the Mini Baja vehicles themselves and the teams' support trucks and trailers are allowed in the pits. Team members may not operate bicycles, skateboards, scooters, motorcycles, quads or other person carrying or motor propelled vehicles in the pits or competition areas.

41.7.4 Occupancy Restrictions

The organizers, at their sole discretion, may limit the pits to team members, faculty advisors and competition officials.

41.8 Driving Restrictions

During the competition Mini Baja vehicles may only be driven between the pits and an event site, during official practice or in the events themselves.

DRIVING OFF-SITE IS ABSOLUTELY PROHIBITED. TEAMS FOUND TO HAVE DRIVEN THEIR VEHICLE AT AN OFF-SITE LOCATION MAY BE EXPELLED FROM THE COMPETITION.

41.9 Loopholes

It is virtually impossible for a set of rules to be so comprehensive that it covers all possible questions about the vehicle's design parameters or the conduct of the competition. Please keep in mind that safety remains paramount during Mini Baja SAE, so any perceived loopholes should be resolved in the direction of increased safety/ concept of the competition.

41.10 Penalties

Organizers have the right to modify the penalties listed in the various dynamic event descriptions to better reflect the design of their event courses, the course lengths or any special conditions unique to the site. The standard dynamic event penalties in these rules are default values that will be applied absent a change by the organizer.

42. RULES OF CONDUCT

42.1 Sportsmanship

All Mini Baja participants can be proud of the excellent sportsmanship and cooperation among teams that are two of the hallmarks of the series. Good conduct and compliance with the rules and the official instructions are expectations and requirements for every team member.

On those extremely rare occasions where there is an incident of unsportsmanlike conduct the organizer is authorized to impose an appropriate penalty.

Unsportsmanlike conduct can include arguments with officials, disobedience of official instructions and the use of abusive or threatening language to any official or other participant. Depending on the seriousness of the infraction the penalty for such actions can range from a deduction of up to fifty percent (50%) of the team's points to expulsion of the entire team. Penalties of this type will only be imposed after a complete review of the incident by the organizer and SAE staff.

42.2 Alcohol and Illegal Material

Alcoholic beverages, firearms, weapons of any type and illegal materials are prohibited at Mini Baja sites during the competition. The penalty for violation of this rule is the immediate expulsion of the entire team, not just the individual(s) involved. This rule applies to team members, advisors and any individuals working with the team on-site.

42.3 Parties

Disruptive parties either on or off-site should be prevented by the faculty advisor.

42.4 Trash Clean-up

Clean-up of trash and debris is the responsibility of the teams. Please make an effort to keep your pit area clean and uncluttered. At the end of the day, each team must clean their work area.

42.5 Site Condition

Please help the organizers keep the site clean. The sites used for Mini Baja are private property and should be treated as such. Competitors are reminded that they are guests of the owners. All

trash should be placed in the receptacles provided. Glass is not allowed on the grounds. Failure to clean the premises will result in an unsportsmanlike conduct penalty. Competitors are encouraged to police their areas after meals.

43. SPECTATOR RULES

43.1 General

The organizers typically do not have a direct line of communication with spectators other than on-the-spot at the competition; thus, the competitors, faculty and volunteers are expected to help inform the spectators of the safety rules and help restrict spectators to the spectator areas.

43.2 Alcoholic Beverages

Spectators may not drink alcoholic beverages at any event location.

43.3 Access Restrictions

Spectators must keep well back from the event and practice tracks and from any area where vehicles are operating under power. Motor vehicle competitions are potentially dangerous and safety rules will be strictly enforced.

43.4 Children

A competition site is not a safe place for children and unsupervised young people. Spectators who fail to strictly control their children will be asked to leave the site.

43.5 Removal of Spectators

The course officials and organizers have the absolute right to restrict spectator access to any parts of the site and to eject anyone who violates safety rules or ignores the instructions of officials.

44. UNSAFE PRACTICES & CONDUCT

All participants are required to exercise safe practices and avoid unsafe activities at all times during the competition. The event organizer has the discretionary authority to impose a just penalty for any conduct deemed unsafe. All team members will be held to this rule.

45. MISCELLANEOUS

45.1 Driver Equipment

Drivers must wear all of the equipment specified in Section 39 “Driver Equipment Requirements" and a properly fastened restraint system at all times when the vehicle is running

in any event or on the test track. Drivers not wearing the proper equipment will not be permitted to drive, and may have their competition driver's privileges revoked.

MINI BAJA EAST ONLY – Seatbelts, helmets, goggles, wrist restraints, and the required clothing must be worn at all times a driver is operating a vehicle on land. Driver equipment rules for water events at Mini Baja East may be adjusted by the organizer depending on the characteristics of the site.

45.2 Practice Area

Practice may only take place in designated areas. Practicing outside of the designated practice area will result in a minimum fifty (50) point penalty and/or the revocation of driving privileges depending on the extent of the infraction.

46. SAFETY – TEAM RESPONSIBILITY

Safety is the primary consideration in the design of Mini Baja vehicles and the conduct of the competitions. Teams need to include safety considerations in all parts of their program. At all performance events, it is the responsibility of the team to ensure both the vehicle and driver meet and follow all the requirements and restrictions of the rules.

SECTION 5 EVENT DESCRIPITION & SCORING

Event and Scoring Comparison Table (North American events)

	East	Midwest	West
STATIC EVENTS – 300 points			
Design			
Report	100	100	50
Evaluation	150	150	100
Cost			
Report	10	10	10
Production Cost	40	40	40
Presentation	---	---	100
DYNAMIC EVENTS – 700 points			
Speed			
Acceleration	60	75	75
Traction			
Hill Climb or Pulling Event	60	75	75
Maneuverability			
Maneuverability	60	75	75
Specialty			
Water Maneuverability	60	---	---
Rock Crawl	--	---	75
Mud Bog	--	75	---
Suspension and Traction	60	---	---
Durability			
Endurance	400	400	400
TOTAL POINTS	1000	1000	1000

51. TECHNICAL INSPECTION

51.1 Technical Inspection - Pass/Fail – Point Deduction

All Mini Baja vehicles must pass a technical inspection before they are permitted to operate under power. The inspection will determine if the vehicle satisfies the requirements and restrictions of the Mini Baja rules. The exact procedures and instruments used for inspection and testing are entirely at the discretion of the National Technical Inspectors. Decisions of the technical inspectors, as confirmed by the National Technical Inspectors, concerning vehicle compliance are final and may not be appealed. Vehicles are to arrive at safety inspection in ready to run condition. If vehicles are not ready for technical inspection when they arrive, they may receive a point deduction.

Technical inspection will consist of three (3) separate parts as follows:

Part 1 – Engine inspection and governor setting

Each vehicle must arrive at Engine inspection with the output shaft bare, and working Kill Switches. Each vehicle engine must be inspected by Briggs and Stratton technical staff who will **(1)** confirm its compliance with the rules and **(2)** set the governor to the specified rpm.

Part 1 must be passed before a team may apply for Part 2 or Part 3 inspection.

Part 2 – Technical inspection and scrutineering

Each vehicle will be inspected to determine if it complies with the requirements and restrictions of the Mini Baja rules. This inspection will include an examination of the driver's equipment including helmet and arm restraints and a test of driver exit time. Each team **must** bring the following items to inspection, if they do not have the items at the time of inspection they will receive a 10pt deduction for each item missing or not completely filled out:

(a) Frame Material Documentation: Receipts documenting the materials purchased, or otherwise acquired, and used to build the frame.

(b) Roll Cage Specification Sheet: A completed copy of the Roll Cage Specification Sheet. (See Rules Section 7)

(c) Technical Inspection Sheet: A properly completed Technical Inspection Sheet. (See 51.1.2) http://students.sae.org/competitions/miniMini Baja/rules/

(d) Drive Train Check Sheet: A properly completed Drive Train Check Sheet is required at technical inspection.

Part 2 must be passed before a team may apply for Part 3 inspection.

Part 3 – Kill switch and dynamic brake testing

Both the external and cockpit kill switches will be tested for functionality. If both switches pass the test then the vehicle will be dynamically brake tested.

Each vehicle must demonstrate its ability to lock all four wheels and come to rest in an approximately straight line after an acceleration run specified by the inspectors.

If a vehicle fails to pass any part of the inspection it must be corrected/modified and brought into compliance with the rules before it is permitted to operate.

The inspectors and officials have the right to re-inspect any vehicle at any time during the

competition and require correction of any non-compliance.

51.1.1 Inspection Stickers

A multi-part inspection sticker will be issued in sections to the team as each of the three parts of technical inspection is completed. The inspectors will place the inspection sticker in a prominent location of their choice. The inspection sticker must remain on the vehicle throughout the competition. Vehicles without all parts of the inspection sticker may not be operated under power.

Technical inspectors and officials may remove any or all parts of the inspection sticker from any vehicle that has been damaged or which they reasonably believe may not comply with the rules.

51.1.2 Technical Inspection Sheet – Pre-inspection Required

Before bringing their car to technical inspection each team **must (1)** pre-inspect the vehicle for compliance with the rules, **(2)** complete the official technical inspection sheet (available on the SAE Mini Baja Website/Technical Inspection Website, http://students.sae.org/competitions/miniMini Baja/rules/) , **(3)** have the completed inspection list signed by the faculty advisor and team captain. Teams should download the most current version of the technical inspection sheet within two weeks of the competition and thoroughly inspect their vehicle in accordance with the sheet.

NOTE: Teams presenting Technical Inspection Sheets that are **(1)** incomplete, **(2)** inaccurate (i.e. do not correspond to the actual condition of the car)**(3)** are found to have more than 3 items not in accordance with the rules, or **(4)** do not represent a serious effort at pre-inspection will be denied inspection at that time and sent back to the end of the inspection line with a 15 point deduction.

51.1.3 "As-approved" Condition

Once a vehicle has passed technical inspection its configuration may not be modified. Approved vehicles must remain in "as-approved" condition throughout the competition. Necessary repairs that do not significantly change the configuration of the vehicle are permitted. Minor adjustments permitted by the rules and normal vehicle maintenance and tuning are not considered modifications.

52. STATIC EVENTS AND REQUIRED REPORTS – TOTAL 300 POINTS

52.1 Engineering Design

Engineering design assessment consists of two events: Design Report and Design Evaluation.

52.1.1 Design Report – East and Midwest – 100 Points, Mini Baja West – 50 Points

The design report should clearly explain the engineering and design process that was used in developing each system of the team's Mini Baja vehicle. The process for each

system could include: Objectives, customer requirements, alternatives considered (e.g. independent rear suspension vs. single rear swing arm, manual transmission vs. CVT, etc.), improvements over last year's design, the result(s) of design calculations, stress analysis, testing, etc.

52.1.2 Design Report – Format

(a) Format – Design reports must follow the format for SAE Technical Papers found at http://www.sae.org/products/papers/paprinfo/presemnt.htm

(b) Electronic version – The design report must be submitted electronically in Adobe Acrobat Format . The document must be a single file (text, drawings and optional content are all inclusive). The design report file must be named as follows: Car #_school name (full name) _competition.

EXAMPLE: Car #141_University of East Mudge_MWMB.

52.1.3 Design Report - Page Limit

The technical paper segment of design report is limited to ten (10) pages, excluding the cover page. Additionally the report may, at the team's option, include up to four (4) non-text, pages of plans, graphics, photographs or other data for a maximum of fourteen (14) pages of information. The only text permitted on the four (4) optional pages are captions. All pages must be either 8 ½ "x 11" or A4.

NOTE: If your paper exceeds 10 pages of technical report or 4 pages of graphics, then only the first 10 technical and 4 graphic pages will be evaluated.

52.1.4 Design Report – Deadline and Submission

Design reports must be received no later than the due date by the individual/address listed in the Action Deadlines page at the end of the Rules. Any Design Report not received by the due date will be subject to a penalty of ten (10) points for each day after the deadline.

Teams that do not submit a Design Report will not be judged in either part of the Design Event and will receive zero (0) points.

(a) Electronic Report: Email the electronic version of the design report to each competition your team has entered by the submission date. Email addresses are listed in the appendix.

52.1.5 Design – Mini Baja East, Midwest - 100 Points, Mini Baja West – 150 Points

Design Evaluation will be conducted at the event site on the first full day of the competition. Cars are expected to be presented for Design Evaluation in essentially finished condition, i.e. fully assembled, complete and ready-to-run.

Vehicles presented in an unfinished condition may receive lower, or zero points for any

incomplete areas that can not be fully assessed by the design judges. Additionally, the judges have the right to refuse to evaluate incomplete vehicles. Teams that are refused judging because of incompleteness will receive zero points for Design Evaluation.

Engineering design will be evaluated, and points awarded in the following areas:

Design category	**East**	**Midwest**	**West**
Originality and innovation	10	35	25
Suspension and brake system	20	25	15
Power train	15	15	10
Structural design	15	15	10
Craftsmanship	15	15	10
Operator Comfort	15	15	10
Feasibility for mass production	20	15	10
Serviceability	20	15	10
Flotation and water propulsion	20	--	--
Total	150	150	100

During design evaluation team members are expected to be able to fully explain and discuss all aspects of their vehicle's design and the rationale behind their design decisions. Teams that are unable to adequately explain the various aspects of their design to the judges satisfaction will receive lower scores down to, and including, zero (0) points.

52.2 Cost Event

Cost consists of two related sections Cost Report and Prototype Cost. The cost report (See section 52.2.1) provides all the background information to verify the vehicles actual cost. The prototype cost (See section 52.2.5) is the actual calculation of points given to each team based on the team's cost compared to the cost of other teams. Although these cost categories areas are scored separately, they are closely related and are evaluated by the same judges. You should treat cost as a single event with two parts. For example, a poorly compiled or documented cost report might not adequately support your represented cost. On the other hand, reporting a prototype cost that you have made artificially low will cause your cost report to be inaccurate and it will be downgraded accordingly.

52.2.1 Cost Report - 10 Points

The Cost Report should contain a maximum of three sections plus cover pages.

Report Section 1 – Overview (Optional) – The optional overview is intended to give your team the opportunity to point out, and briefly comment on, any design features or fabrication processes that are innovative or are expected to result in significant cost savings. You may also use the overview to explain items or processes that might appear to be discrepancies within the report. The overview section is limited to a maximum of four (4) pages and is entirely optional and need not be included.

Report Section 2 – Costing Sheets – The core of the report is the series of costing sheets. This section must contain the one-page summary sheet broken up into the individual subsystem. Each subsystem needs an individual sub-assembly sheets (Form A). Please note that Vehicle assembly Labor cost is for the labor it takes to assemble a subassembly to the Frame. For all fabricated parts on the sub-assemblies sheets (Form A) require a Form B. Please note that the sub-system assembly time is the time it takes to assemble all the parts in that assembly together.

Report Section 3 – Cost Documentation – Include copies of receipts, invoices, price tags, catalogue pages, on-line prices, or such other documentation as you choose, to substantiate the costs of the parts and material that you included in your costing sheets. This cost documentation must be at full retail US prices. The report is expected to be comprehensive, well documented, truthful and accurate.

52.2.2 Cost Report – Electronic Format

Electronic version – The cost report must be submitted electronically in two different documents, 1.) The Microsoft Excel format, using the supplied template posted on the Mini Baja important documents page 2.) A PDF file with all of the pictures, receipts, and any other supporting documentation. **The cost report file must be named as follows: school name (full name), team name (If more than one vehicle is entered).**

52.2.3 Multi-competition Cost Reports – North American Events Only

Teams that are entering more than one of the North American Mini Baja competitions must submit a single multi-competition cost report.

Multi-competition cost reports must (1) Identify all the competition to which the report applies AND the vehicle number at each event. (2) Contain a unique miscellaneous page supported by documentation covering differences and/or corrections/changes made between competitions. If a team does not show up for the event, they will not receive a cost score and their vehicle cost will be removed from the event.

52.2.4 Penalty for Late or Non-Submission

Cost reports arriving after the deadline will be penalized ten (10) points per day up to a maximum of one hundred (100)-points. Failure to submit a cost report will result in a one hundred (100) point penalty. Also, note that the maximum penalty for late or non-submission exceeds the total number of points for the event.

COMMENT: We recommend you bring electronic copies of your cost report and documentation showing submittal date to all competitions.

52.2.4 Cost Judges Authority

The judges have the authority to increase your costs and/or fabrication times if they believe that the figures you have submitted are below current prices for the item, source, or process involved. Prices or times that are higher than the judge would have expected will not be corrected. Mathematical errors will be penalized. Reports that are highly inaccurate, or in which the costs can not be substantiated, may be rejected in their entirety and zero (0) points awarded for Cost.

52.2.5 Prototype Cost - 40 points

Prototype cost is scored on the cost, as corrected by the judges, to produce the finished vehicle brought to the competition.

Your prototype cost score will be calculated as follows:

Prototype cost score = 40 x [(Max Cost – Your Cost)/ (Max Cost – Lowest Cost)]

Where: "Your Cost" is your the cost as corrected by the cost judges, "Lowest Cost" is the corrected the cost of the team producing the lowest cost vehicle and "Max Cost" is the corrected cost of the team producing the highest cost vehicle.

52.3 Presentation - Mini Baja West Only - 100 Points

52.3.1 Presentation - Objective

The objective of the Presentation is for the team to convince the "executives" of a hypothetical manufacturing company to purchase your team's Mini Baja vehicle design and put it into production at the rate of 4000 units per year. For the purposes of the presentation you may assume that the judges are a mixed group of corporate executives who may have experience in marketing, production, and finance as well as engineering.

52.3.2 Presentation - Format

One or more team members may make the presentation to the judges. The presentation itself is limited to a maximum of ten (10) minutes. Following the presentation there will be an approximately five (5) minute question period. Only the judges are permitted to ask questions. Any team member on the presentation floor/stage may answer the questions even if that member did not speak during the presentation itself.

52.3.3 Presentation - Scoring

The presentation event will be scored based on such categories as **(1)** the content of the presentation, **(2)** the organization of the presentation, **(3)** the effectiveness of the visual aids, **(4)** the speaker's delivery, and **(5)** the team's responses to the judge's questions.

Your score will be the average of your individual judge's scores. The team that makes the best presentation will receive the highest score regardless of the finished quality of their actual vehicle.

52.3.4 Projection Equipment

Teams planning to use data projection are responsible for bringing, or other wise arranging for, their own data projectors. Some data projectors may be provided by the organizers; however teams should not rely on either the availability or functionality of such equipment.

53. DYNAMIC EVENTS - TOTAL - 700 POINTS

The dynamic events are intended to determine how the Mini Baja vehicles perform under a variety of conditions. Please note that the organizers have the right to modify the dynamic events to address local conditions, weather or resources.

53.1 Speed Events

53.1.1 Acceleration – 60 or 75 Points

53.1.1.1 Acceleration - Objective

Acceleration determines the time it takes the vehicle to accelerate along 100 ft (30.48 m) or 150 ft (45.72m) flat course. The choice of course length is at the organizer's discretion.

53.1.1.2 Acceleration - Procedure

Each team may make two (2) attempts. Scoring will be based on the better of the two attempts. Timing may be done using either electronic systems or stop watches.

53.1.1.3 Acceleration– Penalties

The organizer has the right to modify the penalties imposed for different violations to account for differences in the length or design of specific event courses.

False Start or Stall at Start	First - Rerun at end
	Second - Run disqualification

53.1.1.4 Acceleration - Scoring

Teams with Acceleration times that are more than twice that of the fastest car will not receive a score for this event. Teams attempting the event, but exceeding the time limit will be classified as "Excess Time". The following equation will be used for the acceleration score:

Acceleration score = 60 *or 75* x [(T longest – T yours)/(T longest – T shortest)]

Where: "T shortest" is the fastest time by any team

"T longest" is either (a)the slowest time by any team **or** (b) 2x the fastest time whichever is the shorter interval

"T yours" is your team's best time

53.2 Traction Event – 60 or 75 Points

The traction events are designed to demonstrate the vehicle's ability to use its traction to accomplish various tasks. At the organizers discression, the traction event will be either the hill climb or a pulling event.

53.2.1 Pulling Event

53.2.1.1 Pulling Event - Objective

The pulling event tests the vehicle's relative ability to pull a designated object, e.g. "eliminator skid", vehicle, or chain, along a flat surface. The organizer will determine the object to be pulled.

53.2.1.2 Pulling Event - Procedure

Each vehicle may make two (2) pulling attempts with the best distance counting for score. Once the vehicle stops moving forward the attempt is over and the attempt is scored for distance at that point. Vehicles may not continue the attempt after they have stopped on the course.

53.2.1.3 Pulling Event – Scoring

Method A: "Pulls to Different Distances" - In the most common instance where the vehicles pull the object to a variety of distances the score will be determined by the following formula:

Pulling Event Score = 60 or 75 x [(D yours – D shortest)/(D longest – D shortest)]

Where: "D shortest" is the shortest pull by any team

"D longest" is the longest pull by any team

"D yours" is your team's best pull

Method B: "Fixed Distance-All Succeed" - Where there is (a) a set maximum pulling distance and (b) all teams succeed in completing a full distance pull, then the score will be based on the time of the pull and calculated by the following formula:

Pulling Event Score = 60 or 75 x [(T longest – T yours)/(T longest – T shortest)]

Where: "T longest" is the longest time by any team
"T shortest" is the shortest time by any team
"T yours" is your team's best time

Method C: "Fixed Distance-Some Succeed" - Where there is (a) a set maximum pulling distance and (b) at least one team makes a full pull and others do not, then the vehicles making the full pull (Group I) will be scored based on time and the vehicles that fail to make a full pull (Group II) will be scored based on distance. Scoring will be by the following formulas:

Group I – Teams that make the full pull will be scored by the following:

Group I Score = 60 or 75 x (T fastest/ T yours)

Where: "T yours" is your team's best time

"T fastest" is the fastest time by any team

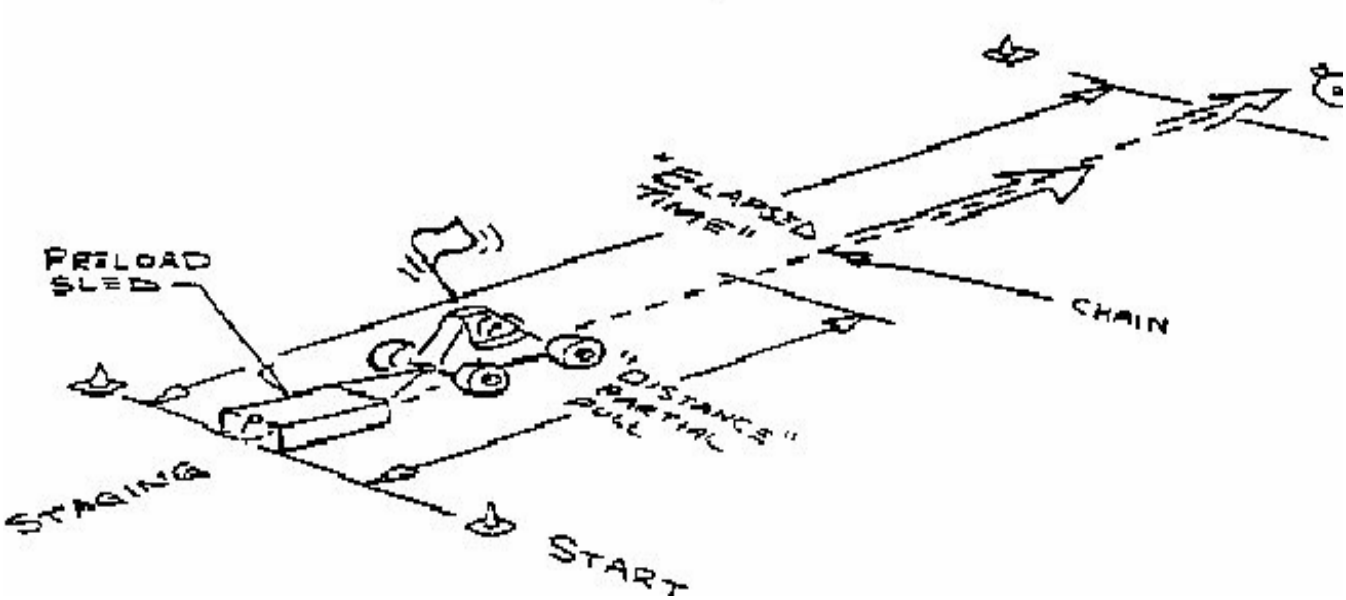
Group II – Teams that do not make the full pull will be scored by the following:

Group II Score = (Lowest score from Group I) x (D yours/D course)

Where: "D yours" is the distance traveled by your vehicle

"D course" is the distance from the starting line to the finish line.

Pulling Event - Example



53.2.2 Hill Climb

53.2.2.1 Hill Climb – Objective

Hill climb assesses each vehicle's ability to ascend a steep grade from a standing start.

53.2.2.2 Hill Climb - Procedure

Each vehicle may make two (2) climbing attempts with the best distance or the fastest completion time for the hill counting for score. If a vehicle stalls before reaching the top of the hill, or if its wheels are spinning without moving the vehicle forward, the attempt is scored for distance at that point.

53.2.2.3 Hill Climb Event - Penalties

The organizer has the right to modify the penalties imposed for different violations to account for differences in the length or design of specific event courses.

Leaving Course	Score as maximum progress in feet at point upon exiting
False Start	First - Rerun at end
	Second - Run disqualification

53.2.2.4 Hill Climb - Scoring

Method A: "Everyone Climbs the Hill"– If all teams succeed in completing a full climb, then the score will be based on the time of the climb and calculated by the following formula:

Hill Climb Score = 60 or 75 x [(T longest – T yours)/(T longest – T shortest)]

Where: "T longest" is the longest time by any team

"T shortest" is the shortest time by any team

"T yours" is your team's best time

Method B: "No One Climbs the Hill"- If no vehicles succeed in climbing the hill, then the score will be based on the distance each team climbs as determined by the following formula:

Hill Climb Score = 60 or 75 x [(D yours – D shortest)/(D longest – D shortest)]

Where: "D shortest" is the shortest distance climbed by any team.

"D longest" is the longest distance climbed by any team.

"D yours" is your team's best climb.

Method C: "Some Teams Make the Climb" - Where (a) at least one team makes the climb while (b) other teams do not, then the vehicles making the climb (Group I) will be scored based on time and the vehicles that stop on the hill (Group II) will be scored based on distance traveled. Scoring will be by the following formulas:

Group I – Teams that complete the climb will be scored by the following:

Group I Score = 60 or 75 x (T fastest/ T yours)

Where: "T yours" is your team's best time

"T fastest" is the fastest time by any team

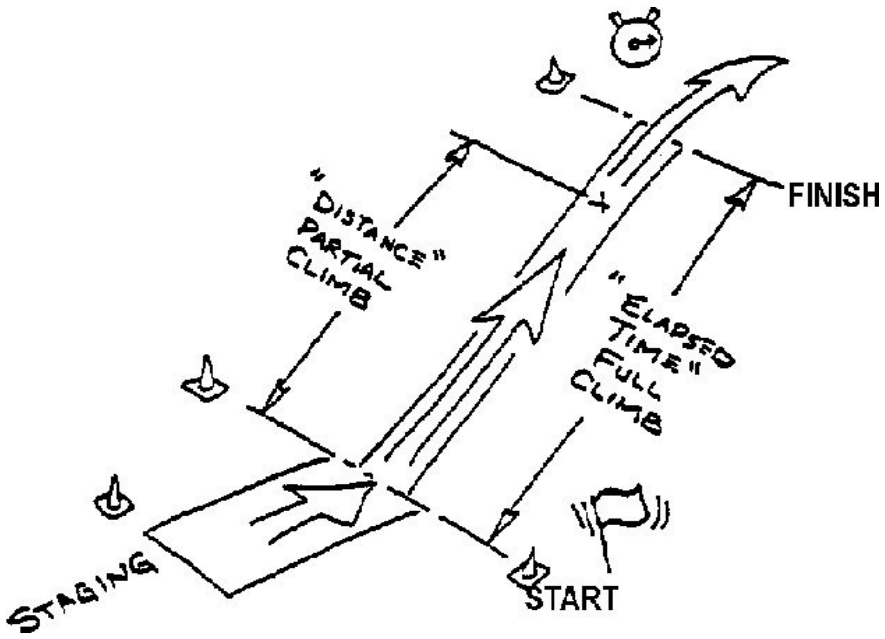
Group II – Teams that stop on the hill will be scored by the following:

Group II Score = (Lowest score from Group I) x (D yours/D hill)

Where: "D yours" is the distance traveled by your vehicle

"D hill" is the length of the hill from the starting point to the finish line.

Hill Climb - Example



53.3 Maneuverability Event – 60 and 75 points

53.3.1 Maneuverability - Objective

Maneuverability is designed to assess each vehicle's suspension, handling and steering. The course may consist of a variety of suspension and handling challenges, at the organizer's option, possibly including tight turns, pylon maneuvers, ruts and bumps, drop-offs, sand, rocks, gullies logs, and inclines.

53.3.2 Maneuverability - Procedure

Each vehicle may make two (2) runs with the best time, including penalties, counting for score.

53.3.3 Maneuverability – Penalty Default Values

The organizer has the right to modify the penalties imposed for different violations to account for differences in the length or design of specific event courses.

Obstacle/Pylon moved	2 seconds
Missed gate	10 seconds
Deliberate course violation	Run disqualification
False Start	First - Rerun at end
	Second - Run disqualification

53.3.4 Maneuverability – Time Limit

Only vehicles that complete the maneuverability course within a time not exceeding two and a half times (2.5x) that of the fastest vehicle will receive a score. If a vehicle is on the course for a time that exceeds twice the fastest time recorded to that point then the Event Captain may declare the attempt over, remove the car from the course and score the attempt as "Excess Time".

53.3.5 Maneuverability – Scoring

Maneuverability scoring is based on the vehicle's time through the course including any penalties.

Maneuverability Score = *60 or 75* x [(T longest – T yours)/(T longest – T shortest)]

Where: "T longest" is either (a) the longest time through the course by any team **or**

(b) 2.5 x "T shortest" whichever is the shorter time

"T shortest" is the shortest time through the course by any team

"T yours" is your team's time through the course

53.6 Specialty Events

Specialty events are designed to test the vehicle under unique off-road conditions that might be available at some Mini Baja competition sites. Organizers may modify the specialty events provided that participating teams are given at least four (4) months advance notice.

53.6.1 Water Maneuverability – Mini Baja East Only - 60 Points

53.6.1.1 Water Maneuverability

Water Maneuverability is designed to assess each vehicle's ability to propel itself through the water while maneuvering around obstacles.

53.6.1.2 Water Maneuverability – Procedure

The course will consist of a body of water containing one or more buoys or obstacles. Each vehicle may make two (2) runs with the best time, including penalties, counting for score. The event will begin and end with the vehicle in the water. The driver must remain in the vehicle at all times.

53.6.1.3 Water Event Harness Release

Drivers may be required to release their safety harnesses when entering water deeper than 0.3 meter (1 foot). Upon exiting the water, a team member may be resent to help refasten the harness. Release requirements will be determined by SAE Staff and the organizer based on conditions.

53.6.1.4 Water Maneuverability – Time limit

Only vehicles that complete the water course within a time not exceeding twice that of the fastest vehicle will receive a numerical score for the event. If a vehicle is on the course for a time that exceeds twice the fastest time recorded to that point, then the Event Captain may declare the attempt over, remove the car from the water and score the attempt as "Excess time".

53.6.1.5 Water Maneuverability – Scoring

Water maneuverability scoring is based on the vehicle's time through the course including any penalties.

Water Maneuverability Score = 60 x [(T longest – T yours)/(T longest – T shortest)]

Where: "T longest" is either (a) the longest time through the water by any team or (b) 2 x T shortest, whichever is the shorter time.

"T shortest" is the shortest time through the water by any team

"T yours" is your team's time through the water.

53.6.2 Rock Crawling – Mini Baja West Only - 75 Points

53.6.2.1 Rock Crawling – Objective

The rock crawling event will be one that combines vehicle low speed power, suspension travel, and traction. The terrain may include large boulders, steps, potholes, and generally rough terrain.

53.6.2.2 Rock Crawling – Procedure

Each team may make two (2) attempts with the best time, including penalties counting for score.

Vehicles will be timed from a stopped position at the beginning of the track to the end or until the vehicle stops moving forward. Teams will go on a walk through prior to the event.

53.6.2.3 Rock Crawling – Stopped Vehicle

Vehicles are declared stopped and distance measured for score if:

1 - Stuck in place -A vehicle is stuck in place for more than twenty (20) seconds.

2 - External assistance - A vehicle receives assistance on the course.

3- Off course- - If a vehicle leaves the course it will be declared stopped at the point first exited.

4 - Roll over – Vehicles that roll over will be considered stopped at the point of roll over.

53.6.2.4 Rock Crawling – Penalties

Missed Gate – 8 seconds or 8 feet
Cone Hit – 5 seconds or 5 feet

53.6.2.5 Rock Crawling – Scoring

NOTE: For vehicles that do not compete the full course, the distance traveled is measured from the starting line to the center of the front wheel.

Method A: "All Vehicles Succeed" - If all vehicles complete the rock crawling course, scoring will be by the following formula:

Score = 75 x [T fastest/T your]

Where: “T yours” is your team’s best time

“T fastest” is the fastest time by any team

Method B: “No Vehicles Succeed” - If no vehicle completes the rock crawling course, scoring will be by the following formula:

Score = 75 x [D your/D longest]

Where: “D yours” is your team’s best distance

“D longest” is the longest distance traveled by any team

Method C: “Some Teams Succeed” - If (a) at least one team completes the course while (b) other teams do not, then the vehicles completing the course (Group I) will be scored based on time and the vehicles that do not finish (Group II) will be scored based on distance traveled. Scoring will be by the following formulas:

Group I – Teams that complete the rock crawl will be scored by the following:

Group I Score = 75 x (T fastest/ T yours)

Where: “T yours” is your team’s best time

“T fastest” is the fastest time by any team

Group II – Teams that stop on the course will be scored by the following:

Group II Score = (Lowest score from Group I) x [(D yours/D course)

Where: “D yours” is the distance traveled by your vehicle

“D course” is the total length of the rock crawling course.

53.6.3 Mud Bog Scoring

Score = 67.5 + 7.5 * (slowest time - your time)/(slowest time - fastest time)

For those who don't make it all the way through

Score = 67.5 * your distance / course distance

53.7 Endurance - 400 Points

53.7.1 Endurance - Objective

(a) General: The endurance event assesses each vehicle's ability to operate continuously and at speed over rough terrain containing obstacles in any weather conditions.

53.7.2 Endurance - General Description

Endurance may be run for either time or distance. Endurance events for time usually run for four (4) hours. Endurance events for distance continue until at least one car has gone the specified distance.

Endurance will be run as either (A) a single four (4) hour race, (B) a predetermined and published distance, or as (C) elimination heats followed by a final in which the total time of one elimination heat plus the final is 4 hours. The organizer will announce the structure of the event prior to the start.

Determining the winner of the endurance race:

- The team, which completes the distance of the competition first, or the greatest distance in the time set for the competition will be declared the winner.
- In competitions of a given distance, the checkered flag will be given first to the leading car, then to the other finishers as they cross the finish line.
- In competitions of a timed length, the checkered flag will be given first to the leading car as it crosses the finish line at or after the expiration of the specified duration, then to the other finishers as they cross the finish line.
- If the leading car is not running at the expiration of the time limit, the checkered flag will be given to the next highest running car in the same manner.

53.7.3 Endurance - Starting

The starting grid for endurance will be based on each team's performance in a previous dynamic competition, or set of dynamic events, to be determined by the organizer. All vehicles will be considered to have begun the race simultaneously at the time when the starter releases the first vehicle onto the course regardless of their actual position in the grid.

53.7.4 Endurance - Command Flags

Command flags are just that – flags that the competitor must immediately obey without question.

Green Flag – (1) At a starting line or when reentering the course: Your run, or session, has started; enter the course under the direction of the starter. (**NOTE**: If you stall the vehicle, restart and await another green flag as the opening in traffic may have closed.)

(2) While running on the course: Course is clear, proceed.

Yellow Flag, Steady – Danger, SLOW DOWN, be prepared to take evasive action, something has happened beyond the flag station. NO PASSING, unless directed by the course workers.

Yellow Flag, Waved – Great danger, SLOW DOWN, evasive action is likely to be required, BE PREPARED TO STOP, something has happened beyond the flag station. NO PASSING, unless directed by the course workers.

Red Flag – Come to an immediate safe and controlled stop on the course. Pull to the side of the course as much as possible to keep the course open. Follow course worker directions. NO PASSING.

Black Flag, Furled and Pointed – Warning, the officials are watching your driving – obey the event rules.

Black Flag, Displayed – (1) Pull into the penalty box for a discussion with the Director of Operations or other official concerning an incident. A time penalty may be assessed for the incident.
(2) Pull into the penalty box for a mechanical inspection of your car, something has been observed that needs closer inspection.

Checkered Flag – Your run, or session, has been completed, exit the course at the first opportunity.

53.7.5 Endurance - Stalled or Disabled Vehicles

Disabled or stalled vehicles must be immediately removed from the roadway. It is the driver's responsibility to assist and cooperate with the course marshals in removing the vehicle.

Cars may only be started with the driver seated with all belts properly fastened. The driver may not exit the vehicle to execute a restart. Course marshals, volunteers or team members may assist drivers in restarting their vehicles.

Officials and course marshals may stop any vehicle, at any time, if they believe it no longer complies with the requirements and restrictions of the rules. If a vehicle is stopped by officials for a mechanical fault, the fault must be corrected/repaired before it may reenter the event.

53.7.6 Endurance - Repairs

The organizer will announce the rules governing repairs that are permitted to be made during the endurance event. If repairs along the course are permitted then vehicles under repair must be removed well off the course, away from the outside of turns and away

from any natural run-off areas.

53.7.7 Endurance Event - Penalty Default Values

The organizer has the right to modify the penalties imposed for different violations to account for differences in the length or design of the course

Failure to stop for Black Flag	10 minutes or 1 lap per flag*

* Whichever the official determines is the greater penalty.

Passing under a Yellow Flag	1 lap penalty
Deliberate Ramming	First time = 10 minutes
	Second time = Disqualification
Deliberate Forcing another	First time = 10 minutes
Vehicle Off Course	Second time = 20 minutes
	Third time = Disqualification
Leaving Course and Advancing	5 minutes
Driving in an Unauthorized Area	10 minutes
Failure to Yield to Traffic on Entering Track	5 minutes
Speeding in Pit Area	5 minutes
Fueling: Fueling will not be allowed until the engine is turned off, the driver is out of the car, and a fire extinguisher is ready. No work will be done on the car when fueling.	30 minutes

53.7.8 Endurance - Scoring

(a) General: The endurance event score is determined by (a) the number of laps each team completes during the endurance final and (b) the finish order of teams at the end of the event.

"Scored laps" are the number of full laps actually completed during the endurance event final. Only full laps count, partial laps do not count for score. A vehicle must cross the counting/timing line under its own power for a lap to be counted.

"Finish order" is the sequence in which vehicles cross the finish line after the lap scoring period has ended. Finish order determines the ranking of teams completing the same number of laps. For example, if the top four teams finish with the same number of laps, then they will be ranked 1st to 4th based on their finish order.

"Bonus points" are additional points awarded to the first ten (10) vehicles on the leading (winning) lap, as separated by finish order as required, in part to differentiate teams finishing with the same number of scored laps. Up to 10 bonus points will be awarded in the inverse order of finish. Thus, the first vehicle to cross the finish line in the highest lap group will receive bonus points equal to the number of cars on the lead lap (max of 10); the second vehicle will receive one less bonus point etc. Example:

Position	Lap	Bonus Points
1	48	4
2	48	3
3	48	2
4	48	1
5	47	0

Endurance scoring is based on number of laps the vehicle completes in the allowed time:

Endurance Score = [400 x (L yours – L lowest)/(L highest – L lowest)] + bonus points

Where: "L highest" is the highest number of laps completed by any team

"L lowest" is the lowest number of laps completed by any team

"L yours" is the number of laps completed by your team

(b) Endurance Heats plus a Final – Point Distribution: When endurance is run as heats plus a final, the points for the event will be distributed between the heats and the final in proportion to the time/distance of each stage.

Thus, if endurance is run as one (1) hour eliminations plus a three (3) hour final, the four hundred (400) total points will be allocated as one hundred (100) points to each elimination heat plus three hundred (300) points to the final.

53.8 Tie breakers

There will be no tiebreakers for static events.

Tiebreakers for dynamic events will be the second best run time or score for the given tied event. If both scores for tied teams in the event are equal then the tie remains.

Ties in the endurance race will be judged by the endurance event judge and may remain a tie.

Ties for overall winner will be broken by the following criteria:

1. Endurance score
2. Total dynamic events score

3. Total static events score

If a tie remains after all the above tiebreakers then the tie remains for the overall winner(s).

SECTION 6 FUTURE MINI BAJA INFORMATION

6.1 Notice of possible rules changes for the 2007 Mini Baja series

TBD

MINI BAJA ROLL CAGE SPECIFICATION SHEET
2006 MINI BAJA COMPETITIONS

SCHOOL NAME _____ **CAR NUMBER** _____

CIRCLE COMPETITION IN WHICH YOU ARE COMPETING: EAST MIDWEST WEST

This sheet MUST be completed and submitted in accordance with the event rules.
Failure to do so will result in penalty.

Purpose: The purpose of this sheet is to facilitate verification of roll cage materials/construction, and to provide a means of tracking the age of older vehicles. This is being done in the interest of safety and good engineering practice.

1. Academic year the cage was constructed? _____
2. Material (type, condition, size)? _____
   _____

   _____
3. Equivalency calculations if needed (attach to this sheet).
4. All welds and/or other attachment methods must be checked for integrity
   Date of inspection _____

NOTE: It is extremely important that such an inspection be made, and for those constructed of materials (i.e. aluminum) which do not exhibit and endurance limit.

WE HAVE EXAMINED THE ABOVE INFORMATION AND TO THE BEST OF OUR KNOWLEDGE DEEM IT TO BE ACCURATE.

TEAM CAPTAIN _____ _____
(SIGNATURE) (DATE)

Team Captain e-mail: _____

FACULTY ADVISOR _____ _____
(SIGNATURE) (DATE)

Faculty Advisor e-mail:

BRING A COMPLETED COPY OF THIS FORM WITH YOU TO TECHNICAL INSPECTION AT EACH MINI BAJA YOUR TEAM IS ENTERING.

2006 Mini Baja SAE East – ACTION DEADLINES
Auburn University, Auburn, AL
April 12-15, 2006

- **Registration – Opens OCTOBER 3, 2005 at 10:00 AM Eastern Daylight Savings Time**
  Register online at: http://www.sae.org/students/student.htm

- **Registration Fee - $500.00**
  Registration deadline – December 29, 2005

- **Engine Orders – Available online upon completion of registration beginning 10/03/05**
  Engine Order Deadline – December 29, 2005

- **Design Reports**
  See Section 52.1.1

  DESIGN REPORTS
  (1) ELECTRONIC REPORTS -must be received by midnight March 15, 2006:
  Send to: FTP site (TBA)

- **Cost Reports Due – must be postmarked by midnight March 31, 2006**
  See Section 52.2.1

  1) COST REPORT TEMPLATE (emailed) –received by midnight March 31, 2006:
  FTP site (TBA)

- **Technical and safety inquiries must be sent via email to the National Technical Inspectors at: Bajarules@sae.org**

- **Go to: for official information.**

2006 Mini Baja SAE Midwest – ACTION DEADLINES
SAE Milwaukee Section, Milwaukee, WI
May 24-27, 2006

- **Registration – Opens OCTOBER 3, 2005 at 10:00 AM Eastern Daylight Savings Time**
  Register online at: http://www.sae.org/students/student.htm

- **Registration Fee - $500.00**
  Registration deadline – December 29, 2005

- **Engine Orders – Available online upon completion of registration beginning 10/03/05**
  Engine Order Deadline – December 29, 2005

- **Design Reports**
  DESIGN REPORTS:
  (1) ELECTRONIC REPORTS – must be received by midnight April 3, 2006
  Send to: FTP site (TBA)

- **Cost Reports Due – must be postmarked by midnight March 31, 2006**
  See Section 52.2.1

  1) COST REPORT TEMPLATE (emailed) – must be received by midnight March 31, 2006: FTP site (TBA)

- **Technical and safety inquiries must be sent via email to the National Technical Inspectors at: Bajarules@sae.org**

- **Go to: http://www.sae.org/students/minibmw.htm for official information.**

2006 Mini Baja SAE West – ACTION DEADLINES
SAE Portland Section, Portland, OR
May 11-13, 2006

- **Registration – Opens OCTOBER 3, 2005 at 10:00 AM Eastern Daylight Savings Time**
  Register online at: http://www.sae.org/students/student.htm

- **Registration Fee - $500.00**
  Registration deadline – December 29, 2005

- **Engine Orders – Available online upon completion of registration beginning 10/03/05**
  Engine Order Deadline – December 29, 2005

- **Design Reports Due**
  DESIGN REPORTS:
  (1) ELECTRONIC REPORTS – must be received by midnight
  Send to: FTP site (TBA)

- **Cost Reports Due – must be postmarked by midnight March 31, 2006**
  See Section 52.2.1

  1) COST REPORT TEMPLATE (emailed) – must be received by midnight March 31, 2006: FTP site (TBA)

- **Technical and safety inquiries must be sent via email to the National Technical Inspectors at: Bajarules@sae.org**

- **Go to: http://www.sae.org/students/minibw.htm for official information, as well as;**
  http://www.oregonsae.org/2006mbw/

2006 Mini Baja SAE South Africa – Information

University of Pretoria, South Africa
October, 2006

Note: All Submissions Must Be RECEIVED By the Deadline-NOT POSTMARKED

- **Registration – Opens FEBRUARY 1, 2006**
  Register online at: www.me.up.ac.za/mini_Baja/index.htm

- **Early Registration Fee - FREE**
  Early Registration deadline – MARCH 4, 2006

- **Late Registration Fee - $100.00**
  Late Registration Deadline – SEPTEMBER 30, 2006

- **Engine Orders – Free for local teams (contact organizer Schalk Els)**
  Engine Order Deadline – MARCH 4, 2006

- **DESIGN, COST AND ROLL CAGE REPORTS DUE – SEPTEMBER 30, 2006**

  DESIGN, COST AND ROLL CAGE REPORTS ARE TO BE MAILED TO:

  Schalk Els
  University of Pretoria Main Campus
  Department of Mechanical and Aeronautical Engineering
  Engineering 1 Building
  Room 10-11
  Lynnwood Road
  Pretoria, 0002
  South Africa

- **Rules questions and inquiries regarding the organization of the South African Mini Baja event specifically, go to Schalk Els at: schalk.els@eng.up.ac.za**

- **Go to: http://www.me.up.ac.za/mini_Baja/index.htm for official event website**

2006 Mini Baja Brazil – Information

SAE BRAZIL - Brazil
April, 2006

FOR INFORMATION REGARDING MINI BAJA BRAZIL 2006, CHECK THE OFFICAL WEBSITE at http://www.saebrasil.org.br/.

2006 Mini Baja Korea – Information

Yeungnam University – Korea

FOR INFORMATION REGARDING MINI BAJA KOREA 2006, CHECK THE OFFICAL WEBSITE at http://yu.ac.kr/~race/spboard/board.cgi?id=main.

2006 Mini Baja Mexico – Information

FOR INFORMATION REGARDING MINI BAJA MEXICO 2006, CHECK THE OFFICAL WEBSITE at http://www.saemex.com/Paginas/Mini Baja.htm.