

Unofficial Baja SAE 2010/2009 Rules Comparison

TOC

2010: Only first level included

2009: Drills down to each sublevel

Introduction

2010: Adds cursory rules change section - See rules for specifics

2009: N/A

10. Overview

2010: The Baja SAE® competition originated at the University of South Carolina in 1976, under the direction of Dr. John F. Stevens. Since that time, the Baja SAE Series has grown to become a premier engineering design series for university teams.

2009: 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 Baja SAE Series has grown to become a premier engineering design series for university teams.

10.3 - The Baja SAE Series

2010: Some sections of rules governing Baja SAE events held outside North America are specific competitions. Such variations are published on the individual websites. The dynamic events at competitions may differ.

2009: Some sections of rules governing Baja SAE events held outside North America are specific to those competitions. Such variations are published on the individual websites. The dynamic events at competitions differ.

12.1.2 Society Membership

2010: Those interested may join SAE at: www.sae.org/students

2009: Join SAE at: www.sae.org/students

12.1.6 Individual Registration Requirements - ACTION REQUIRED

2010: **Note: When your team is registering for a competition, only the student or faculty advisor completing the registration needs to be linked to the school. All other students and faculty can affiliate themselves after registration has been completed; however this must be done before the deadline of February 26, 2010.

2009: **NOTE: When your team is registering for a competition, only the student or faculty advisor completing the registration needs to be linked to the school. All other students and faculty can affiliate themselves after registration has been completed, however this must be done on or before February 27, 2009.

20.2 Vehicle Configuration

2010: The vehicle must have four (4) or more wheels not in a straight line. The vehicle can only use one Briggs & Stratton engine. The vehicle must be capable of carrying one (1) person 190cm (6'3") tall weighing 113kg (250lbs).

2009: The vehicle must have four (4) or more wheels not in a straight line. Three (3) wheeled vehicles are prohibited from the competition. The vehicle must be capable of carrying one (1) person 190cm (6'3") tall weighing 113 kg (250lbs).

21.4 Engine Requirements and Restrictions

2010: The following Briggs & Stratton engines are the only acceptable engines for the 2010 Baja SAE competitions:

Model	Type
205432	0536-E9
205332	0536-E9
205332	0536-B1

2009: The following Briggs & Stratton engines are the only acceptable engines for the 2009 Baja SAE competitions:

Model	Type
205432	0036-E1
205432	0036-E9
205432	0536-E9
205332	0536-E9
205332	0536-B1

21.4.11 Exhaust System

A. Muffler

2010: 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.

2009: The 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 must pass through a single muffler. Multiple mufflers are not allowed.

21.4.11 Exhaust System

G: Exhaust System - Durability Required

2010: The exhaust pipe and muffler must be completely intact and operational throughout the event. Any car found to have a loose or leaking exhaust system will be removed from competition until the issue can be corrected. If the muffler becomes loose, in either relocated or stock position, the vehicle will be black flagged and it will need to be fixed before continuing.

2009: 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.

**21.4.12 Starter
was Starter Rope**

2010: **Note from Briggs & Stratton:** It is recommended that a minimum of a two inch clearance be maintained around the starter to allow for cooling.

2009: N/A

21.4.13 Engine Governor

2010: The governor operation must remain free of obstructions at all times. Governor area must be shielded from debris. The stock configuration of fuel tank mounted to the engine is acceptable for debris management. However, if the fuel tank is to be remote mounted, a debris shield covering the exposed governor area will be required. Use Briggs & Stratton part number 697326 Control Cover or equivalent.

2009: N/A

21.4.15 Hybrid Electric Power Systems

2010: Hybrid electric power systems are specifically prohibited.

2009: N/A

**21.4.16 Storage Energy Devices Used for Propulsion
was 21.4.18**

**21.5 Engine Inspection
was 21.6**

**21.6 Engine Use Restriction
was 21.7**

22 Electrical System

2010: Design Objective

The electric system must at minimum, consist of the engine, two kill switches, brake light, and battery power source. The kill switches must be capable of turning off the ignition and the entire electrical system of the car, including accessories. Brake light, reverse light and reverse alarm are required not to be turned off.

2009: N/A

22.1 Battery Requirements

was 21.4.15

2010: The batteries must be sealed and not leak in the event of a roll over. A sealed battery is one that is incapable of being opened or serviced. The batteries can only provide power to accessories on the vehicle (brake light, reverse light & beeper, data acquisitions, and other instrumentation). Final approval on any batteries used will come from the National Technical Inspectors. The battery must be able to provide power to safety items for the duration of the entire event. Cars will be black flagged if safety equipment is not functioning. Batteries must be mounted with sound engineering practice. The mounting must prevent the battery from coming loose during a roll over.

2009: The batteries must be sealed and not leak in the event of a roll over. The batteries can only provide power to accessories on the vehicle (brake light, reverse light & beeper, data acquisitions, and other instrumentation). Final approval on any batteries used will come from the National Technical Inspectors. The battery must be able to provide power to safety items for the duration of the entire event. Cars will be black flagged if safety equipment is not functioning. Batteries must be mounted with sound engineering practice. The mounting must prevent the battery from coming loose during a roll over.

22.2 Onboard Instrumentation/Data Acquisition/Electronic Controls

was 21.4.16

2010: Onboard instrumentation, data acquisition, and electronic controls of the suspension and transmission are all allowed; the power for these components must come from approved batteries per 22.1 if the battery is being charged by a Briggs alternator.

2009: Onboard instrumentation/data acquisition is allowed; the power for this instrumentation must be from approved batteries per 21.4.15.

22.2.1 Electronic Controls

was 21.4.17

22.3 Kill Switches

was 32.7

22.3.1 Kill Switch - Type

was 32.7.1

22.3.2 Kill Switch - Locations and Orientation

was 32.7.2

22.3.3 Wiring

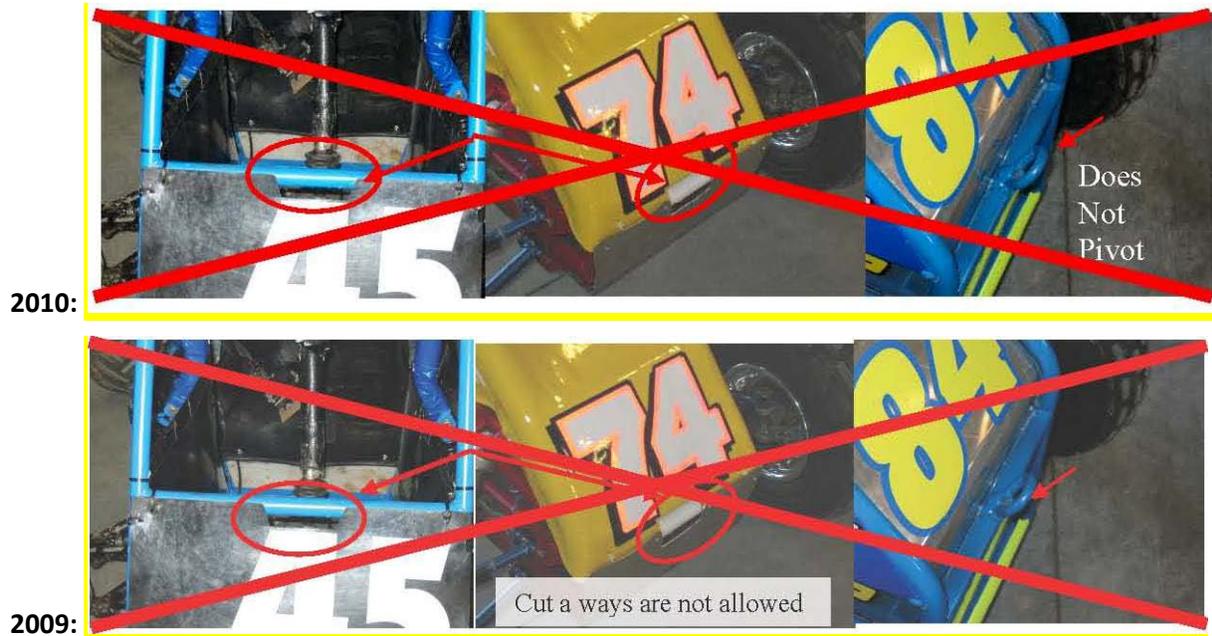
was 32.7.3 Kill Switch - Wiring

22.4 Brake Light was 34.3

2010: The vehicle must be equipped with a red brake light that is mounted such that the light shines parallel to the ground, not up at an angle. The brake light must be mounted at a minimum of 1 meter (39.4 in) off of the ground, generally between half and the top third of the height of the firewall. The determination of whether or not a brake light meets the required standards rests with the National Technical Inspectors.

2009: The vehicle must be equipped with a red brake light that is mounted such that the light shines parallel to the ground, not up at an angle. The lens must be marked with an SAE "S" or "U" rating (i.e.:SAE IPRSTM) or if it is not rated as per SAE J759, it must be equal to or exceed these standards. For lights with no SAE rating, teams must provide documentation to verify that the light meets or exceeds standard SAE J586. The determination of whether or not a brake light meets the required standards rests with the National Technical Inspectors.

23.1 Front Hitch Point



24.4 was 24.4 School Name

2010: All vehicles must display their school name or initials.

2009: 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 in) high. Teams may also display their school name in non-roman characters provided the roman character set is highest on the car.

30.1.1 Technical Inspection

2010: All Baja vehicles must pass a technical inspection before they are permitted to compete. Once a vehicle has passed technical inspection, it must remain “as approved” condition throughout the competition. Repairs must be made with parts that are identical. Parts that are not identical, must get approved from a National Technical Inspector prior to replacement.

2009: All 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.

31.2.1 Elements of the Roll Cage

2010: Additional required members must be steel and only have a minimum thickness of .89 mm (.035 in) and a minimum outside diameter of 2.54 cm (1.0 in) and are as follows:

Lateral Diagonal Bracing (LBD)

Lower Frame Side (LFS)

Side Impact Member (SIM)

Fore/Aft Bracing (FAB)

Front Lateral Cross Member (FLC)

Under Seat Member (USM)

Any tube that is used to mount the safety belts

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Lateral Diagonal Bracing (LBD)

Lower Frame Side (LFS)

Side Impact Member (SIM)

Fore/Aft Bracing (FAB)

Front Lateral Cross Member (FLC)

Any tube that is used to mount the safety belts

31.2.3 Rear Roll Hoop Lateral Diagonal Bracing (LBD)

2010: Lateral bracing for the Rear Roll Hoop will begin at a point along the vertical portion of the RRH where the edge of the joint is within 12.7 cm (5 in) vertically of point BR or BL and extend diagonally to an edge of a joint no farther than 12.7 cm (5 in) above point AR or AL (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.

2009: Lateral bracing for the Rear Roll Hoop will begin at a point along the vertical portion of the RRH within 12.7 cm (5 in) vertically of point BL or BR and extend diagonally to a point no farther than 12.7 cm (5 in) above point AR or AL (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.

31.2.4 Roll Head Overhead Member (RHO)

2010: Roll Hoop Overhead members shall join the RRH within 5.1 cm (2 inches) vertically or laterally of points B and extend generally horizontal to point C. The tubes must be continuous and no break members from point B to point C are allowed. 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). (See RC3). Points CR and CL shall be joined by a lateral cross member (LC).

2009: Roll Hoop Overhead members shall join the RRH within 5.1 cm (2 inches) vertically or laterally of points B and extend generally horizontal to point C. The tubes must be continuous and no break members from point B to point C are allowed. 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** (See RC3). Points CR and CL shall be joined by a lateral cross member (LC).

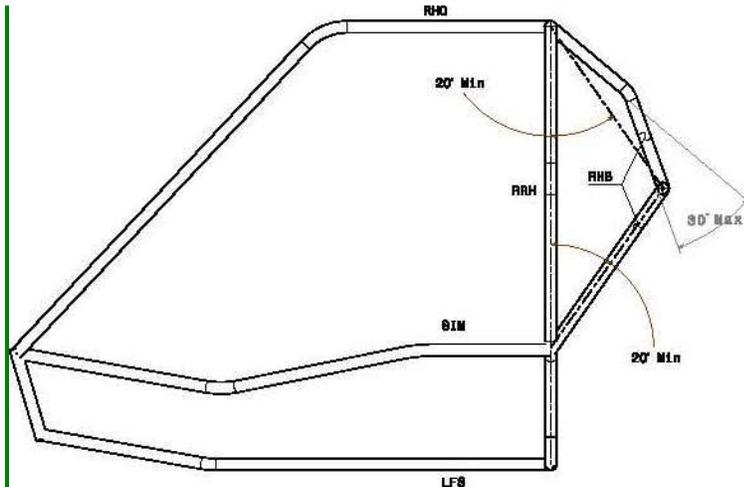
31.2.6 Under Seat Member (USM)

2010: An under seat member (USM) shall attach to the LFS members, and pass beneath the seat. The USM shall be positioned in such a way to prevent the seat and/or driver from passing through the plane of the LFS in the event of seat failure.

2009: N/A

31.2.8 Roll Hoop Bracing (FAB)

2010: 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. From a side view, the angles of the triangulation must be no less than 20 degrees. A bent tube cannot exceed 81.3 cm (32 inches) in total length and the bend shall not exceed 30 degrees (see figure)



2009: 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. The angles of the triangulation must be no less than 20 degrees. A bent tube cannot exceed 81.3 cm (32 inches) between attachment points.

31.2.8.2 Rear Bracing

2010: 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 at or below the SIM. From a top view, plane created by the RHB members shall be maximum of 15 degrees from the plane created by the RRH (see figure 31.2.8.2.1). The RHB members on the right and left side shall be connected by a cross member at the node or as close as possible to the bend which makes up the vertex of the RHB.

2009: 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 at or below the SIM.

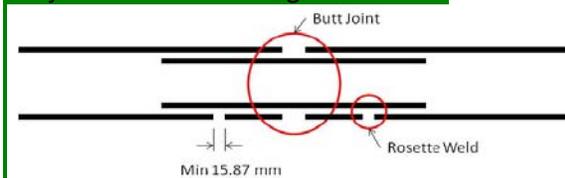
31.2.9 RHO/FBM Gusseting

2010: If the RHO and FBM are not fabricated from a continuous tube, a gusset is required at point C. Gussets shall be made of steel by two methods, 1.) Steel tubing meeting the min requirement of 31.2.1 or 2.) Steel plate, be triangular from a side view, and have a minimum thickness of 0.065". The gussets shall be welded to the sides of the tubes and not directly in the plane of the tubes making up each joint (See RC6). The length of the gusset must be at least 3 times the tube diameter.

2009: If the RHO and FBM are not fabricated from a continuous tube, a gusset is required at point C. Gussets shall be made of steel plate, be triangular from a side view, and have a minimum thickness of 0.065". The gussets shall be welded to the sides of the tubes and not directly in the plane of the tubes making up each joint (See RC6). The length of the gusset must be at least 3 times the tube diameter.

31.2.10 Butt Joints

2010: All butt joints within any of the elements on the roll cage listed in sections 31.2.1 (excluding the required no break members described in 31.2.2, 31.2.4, and 31.2.7) must be reinforced with a welded sleeve. A butt joint is defined as a joint where two tubes come together generally along the same line and are not supported by a third tube at the node. The sleeve must be designed to tightly fit on the inside on the joint being reinforced (i.e. external sleeves are not allowed), must extend into each side of the sleeved joint, a length of at least two times the diameter of the tubes being reinforced, and be made from steel at least as thick as the tubes being reinforced. In addition to meeting basic geometry requirements, the sleeve must be designed and fabricated to both reinforce the joint and to distribute the stress concentrations of the heat affected zone. A minimum of 4 linear inches of weld length is required to secure the sleeve inside the joint, and the welds must be clearly visible from the outside of the joint. Refer to the Figure # below.



2009: All butt joints within any of the elements on the roll cage listed in section 31.2.1 (excluding the required no break members described in 31.2.2, 31.2.4 and 31.2.7) must be reinforced with a welded sleeve. A butt joint is defined as a joint where two tubes come together generally along the same line and are not supported by a third tube at the node. The sleeve must be designed to tightly fit on the inside on the joint being reinforced (i.e. external sleeves are not allowed), must extend into each side of the sleeved joint, a length of at least two times the diameter of the tubes being reinforced, and be made from steel at least as thick as the tubes being reinforced. In addition to meeting basic geometry requirements, the sleeve must be designed and fabricated to both reinforce the joint and to distribute the stress concentrations of the heat affected zone.

31.3 Head Restraint

2010: 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 212 sq. cm (36 sq inches), and be padded with a foam that meets SFI 45.2 specifications. The Foam cannot have more than 3 layers laminated together to create the 5.08cm thickness. The restraint must be a minimum thickness of 5.08cm (2.0 inches), and be located no more than 2.5 cm (1 inch) away from the helmet in the uncompressed state. The head restraint must be mechanically fastened (NO Velcro or adhesive) to the vehicle, preferably the vehicle frame. Head restraints may also be mechanically fastened or integral to the driver's seat. The head restraint must meet the above requirements for all drivers. For a listing of manufacturers of SFI 45.2 foam, see: <http://www.sfifoundation.com/manuf.html#45.2>

2009: 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), and be padded with a closed cell foam that has a density of 50-100 kg/m³. The restraint 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 be securely mounted to the vehicle. The head restraint must meet the above requirements for all drivers.

31.5 Roll Cage & Bracing Materials

2010: 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 25mm (1 inch) and a wall thickness of 3 mm (.120 inch) and a carbon content of at least 0.18%

OR

(B) If the standard tubing sized specified above are not used, required roll cage members must be made of steel with at least equal bending stiffness and bending strength to 1018 steel having a circular cross section with a 25.4 mm outer diameter and a wall thickness of 3.05 mm, nominally. All calculations showing the equivalence must be in SI units. Calculations proving equivalence must be performed using three significant figures to the nominal tube sizes as specified by the vendor on the invoice.

2009: 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 3.05 mm (.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 2.54 cm (1 inch) outer diameter and a wall thickness of 3.05 mm (.120 inch). All calculations showing the equivalence must be in SI units.

31.8 Bolted Roll Cages

2010: Bolted Roll cages are acceptable only if the following requirements are met (see figure 31.8.1 below):

(A) Flanges or tabs must be twice (2X) the thickness of the frame tube, made of the same material type. They must be properly welded to each tubing part to be joined. The face of the flange must be perpendicular to the axis of the frame tube.

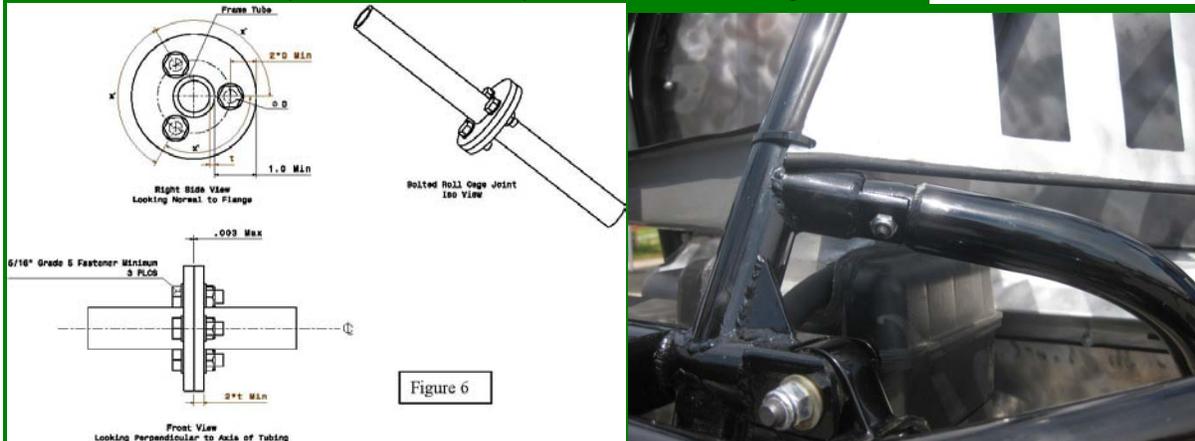
(B) The radius of the flange must be at least 1" larger than the outer radius of the frame tube.

(C) The gap between faces of the flanges (before being tightened) must be no greater than .07mm (.002) inches.

(D) The flanges must be attached with at least 3 bolts with a minimum diameter of 5/16", equally spaced on the flanges.

The minimum distance between the bolt hole and the edge of the flange must be 2*Diameter of the bolts used <See Figure 6>

Note: Pin Joints are not permitted under any circumstances (see figure 31.8.1)



2009: 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, and with no gap between the faces greater than .07 mm (.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 bolts must be reinforced such that the area through which the bolt passes cannot be compressed from tightening or impact.

32.5 Belly Pan

2010: The cockpit should be fitted with a belly pan over the entire length of the cockpit, so the driver cannot contact the ground and is protected from debris while seated normally. Belly pan material must be metal, fiberglass, plastic, 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.

2009: The cockpit should be fitted with a belly pan over the entire length of the vehicle, so the driver cannot contact the ground and is protected from debris while seated normally. Belly pan material must be metal, fiberglass, plastic, 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.

33.2.1 Vertical Location

2010: **The shoulder belt mounts must be made within 4 inches of shoulder.** The shoulder belts must **NOT** be mounted above the shoulder level, and must be protected by the firewall. Shoulder belts must be **mounted to the vehicle** no more than 102 mm (4 inches) below the perpendicular from the spine to the seat back at the shoulder level.

2009: The shoulder belts must **NOT** be mounted above the shoulder level, and must be protected by the firewall. Shoulder belts must be no more than 102 mm (4 inches) below the perpendicular from the spine to the seat back at the shoulder level.

33.2.2 [Rule # Missing in 2010 rules)

33.2.3 Harness Attach Points

2010: The shoulder harness must be securely mounted to the primary **welded** structure **of the vehicle and within the plane of the RRH.** **Shoulder belts must be looped around a frame tube and have something designed to limit the belt movement.** The belts may go through the firewall as long as additional firewall material is added to protect that portion of the belt.

2009: The shoulder harness must be securely mounted to the primary structure. **Shoulder belts must be looped around a frame tube and have something designed to limit the belt movement.** The belts may go through the firewall as long as additional firewall material is added to protect that portion of the belt.

33.3.1 Specified Lap & Anti-Submarine Belts Mounting

2010: The frame tabs which accept the lap belt and anti-submarine belt mounting tabs must meet the following requirements:

- 1) The lap belt tabs must be mounted in double-shear. (See Figure 10)
- 2) The frame tabs that accept the lap belt tabs shall be no less than 2.3mm thick (.090").
- 3) The tabs mounted to the frame to accept the lap belt tabs shall have no less than 38mm (1.5") of weld length (per each tab) where mounted to the frame.
- 4) These tabs shall have no less than 6.4mm (.25") of material in the radial direction from the edge of the mounting bolt hole to the closest outside edge of the mounting tab.
- 5) Where the harness tab mounts to the frame tabs, the lap belt must be capable of pivoting freely about the axis of the mounting bolt such that the webbing and tab can align with the direction of the load. The height of the tab is free, but ultimately subject to the judgment of the National Technical Inspectors. The mount should not exhibit noticeable deformation when pulled on during technical inspection.

6) Anti-Submarine belts may not be mounted forward of the leading edge of the seat, or aft of the lap belt mounting points.

7) Teams that wish to loop their anti-submarine belt around a tube must meet the following requirements:

a) The mounting tube shall not be less than 1.0 in. in diameter and have a wall thickness less than 0.035 in.

b) The webbing of the anti-submarine belt shall be protected from exposure to the ground and not in contact with the belly pan

2009: The frame tabs which accept the lap belt mounting tabs must meet the following requirements:

- 1) The lap belt tabs must be mounted in double-shear. (See Figure 6)
- 2) The frame tabs that accept the lap belt tabs shall be no less than 2.3mm thick (.090").
- 3) The tabs mounted to the frame to accept the lap belt tabs shall have no less than 38mm (1.5") of weld length where mounted to the frame.
- 4) These tabs shall have no less than 6.4mm (.25") of material in the radial direction from the edge of the mounting bolt hole to the closest outside edge of the mounting tab.
- 5) Where the harness tab mounts to the frame tabs, the lap belt must be capable of pivoting freely about the axis of the mounting bolt such that the webbing and tab can align with the direction of the load. The height of the tab is free, but ultimately subject to the judgment of the National Technical Inspectors. The mount should not exhibit noticeable deformation when pulled on during technical inspection.

34.3 Brake(s) Location

was 34.4 Brake(s) Location

2010: 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 or a differential is prohibited.

2009: 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.

34.4 Cutting Brakes

was 34.5 Cutting Brakes

35.1 System Location

2010: The entire fuel system must have clearance between the outermost portion of the fuel system and any two frame members. The tank mountings must be designed to resist shaking loose.

2009: 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.

37.1 Fasteners

2010: All fasteners in the engine, steering, suspension, braking (rotors and bias bars are exempt); throttle pedal and driver restraint systems must meet the following guidelines.

2009: All fasteners in the engine, steering, suspension, braking (all calipers, all master cylinder mounting, and non OEM rotors & hub systems), throttle pedal and driver restraint systems must meet the following guidelines.

37.1.1 Lock Wire Procedure Detail *removed from 2010 rules*

37.2 Fastener Grade Requirements

2010: All threaded fasteners utilized in Section 37 including the steering, braking, driver's harness and suspension systems must meet or exceed, SAE Grade 5, Metric Grade 8.8 and/or AN/MS specifications. See Figures below.

2009: All bolts used in the systems designated in Section 37 must meet SAE grade 5, metric grade M8.8 or AN military specifications. See Figures below.

37.6 Modified Fasteners

2010: Fasteners which have been modified in any way other than: (1) drilling for safety wire or (2) shortening of the shank (threads) shall be subject to all requirements set forth in rule 37.5

2009: N/A

38.1 Powertrain Guards

2010: 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 of the belt or chain and must be wider than the rotating part they are protecting. They must be mounted with sound engineering practice, in order to resist vibration. They must be either (a) made of AISI 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. Equivalency calculations for the alternative material must meet the following requirements: All calculations must be shown in SI units. Calculations must use the following material properties for the 1010 steel: Yield Strength = 305 MPA, Ultimate Strength = 365 MPA, Elongation at Break = 20.0%, Modulus of Elasticity = 205 GPa. Documentation from the material manufacturer showing the Ultimate Strength, Elongation at Break, and Modulus of Elasticity of the alternative material must be provided. If a stress-strain curve for the alternative material is not provided then it must be assumed that the stress strain curve is linear to the yield point and linear from the yield point to the ultimate strength, where strain = elongation at break (See Figure10)

Note: Driveshafts moving faster than the drive axles may use a securely mounted driveshaft loop in lieu of a scatter shield

No Polycarbonate materials are allowed; i.e. Lexan

2009: 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 of the belt or chain. They must be mounted with sound engineering practice, in order to resist vibration. They must be either **(a)** made of AISI 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. Equivalency calculations for the alternative material must meet the following requirements: All calculations must be shown in SI units. Calculations must use the following material properties for the 1010 steel: Yield Strength = 305 MPA, Ultimate Strength = 365 MPA, Elongation at Break = 20.0%, Modulus of Elasticity = 205 GPa. Documentation from the material manufacturer showing the Ultimate Strength, Elongation at Break, and Modulus of Elasticity of the alternative material must be provided. If a stress-strain curve for the alternative material is not provided then it must be assumed that the stress strain curve is linear to the yield point and linear from the yield point to the ultimate strength, where strain = elongation at break (See Figure10). **If a fiber reinforced composite material is used, then a stress strain curve must be provided for worst-case tensile loading. Additionally, the curve for the composite material must be specific to the matrix and manufacturing methods used. Lastly, the minimum fiber reinforced composite material must be 3.175mm (.125 inch) thick.**

38.2 Factory Stock Guards

2010: Factory stock guards must be demonstrated to be equal to those described in 38.1. OEM Polaris CVT covers that are not modified are allowed. **These covers must still meet the finger guard requirements and need a guard over the vent.**

2009: Factory stock guards must be demonstrated to be equal to those described in 38.1. OEM Polaris CVT covers that are not modified are allowed.

41.5 Engine and Drivetrain Inspection

2010: The National Technical Inspectors reserve the right to impound and inspect any vehicle during the dynamic or endurance events. Any vehicle found to have: (1) a drivetrain configuration not matching the Drivetrain Certification Form submitted during technical inspection or (2) an engine in violation of rules sections 21.4 through 21.4.14.4, 21.5, and 21.6 shall receive **a point deduction of 75 points each time they are found in violation.**

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

2009: The National Technical Inspectors reserve the right to impound and inspect any vehicle during the dynamic or endurance events. Any vehicle found to have: (1) a drivetrain configuration not matching the Drivetrain Certification Form submitted during technical inspection or (2) an engine in violation of rules sections 21.4 through 21.4.14.4, 21.5, 21.6 shall receive **zero (0) for all dynamic competition events completed during the day on which the inspection was performed.**

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

42.3 Smoking - Prohibited

2010: **Smoking is prohibited in all competition areas.**

2009: N/A

42.7 Motorcycles, Bicycles, Rollerblades, etc- Prohibited

2010: **The use of motorcycles, quads, bicycles, scooters, skateboards, rollerblades or similar person-carrying devices by team members and spectators in any part of the competition area, including the paddocks is prohibited.**

2009: N/A

50.1 Technical Inspection - Pass/Fail was Technical Inspection - Pass/Fail 50 Points

2010: All Baja SAE 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 Baja SAE 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 technical inspection in ready to run condition **with all drivers present, safety equipment and documentation**. If vehicles are not ready for technical inspection when they arrive, they **will be send away**. Faculty advisors are not allowed to participate during technical inspection. The team captain or other designated members of the team shall do all the presenting.

2009:All Baja SAE 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 Baja SAE 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 technical inspection in ready to run condition **with all drivers present, safety equipment and documentation**. If vehicles are not ready for technical inspection when they arrive, they **may receive a point deduction**. Faculty advisors are not allowed to participate during technical inspection. The team captain or other designated members of the team shall do all the presenting. **All vehicles that do not pass technical inspection by the end of the Static Events will receive a score of zero (0) points.**

50.1 Part 2 - Technical Inspection was Technical Inspection and Scrutineering

2010: Each vehicle will be inspected to determine if it complies with the requirements and restrictions of the Baja SAE rules. This inspection will include an examination of the driver's equipment including helmet and arm restraints, a test of driver exit time and to ensure that all drivers meet the requirements of the rules. Each team **must** bring the following items to inspection.

2009: Each vehicle will be inspected to determine if it complies with the requirements and restrictions of the Baja SAE rules. This inspection will include an examination of the driver's equipment including helmet and arm restraints, a test of driver exit time and to ensure that all drivers meet the requirements of the rules. 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 10 point deduction for each item missing or not completely filled out:**

50.1.2 Technical Inspection Sheet - Pre-inspection Required

2010: 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 Baja SAE Rules and Important Documents website, <http://students.sae.org/competitions/bajasae/rules/>), **(3)** have the completed inspection list signed by the faculty advisor and team captain. Teams must 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. All drivers must be at technical inspection or they will be removed from the list of drivers.

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 4 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.

2009: 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 Baja SAE Rules and Important Documents website, <http://students.sae.org/competitions/bajasae/rules/>), **(3)** have the completed inspection list signed by the faculty advisor and team captain. Teams must 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. All drivers must be at technical inspection or they will be removed from the list of drivers **and a 10 point penalty will be applied to the team.**

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 4 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.**

50.1.3 "As-approved" Condition

2010: Once a vehicle has passed technical inspection its configuration may not be modified. **All accessory components such as roofs, wings, bumpers, etc. are considered part of the configuration and must remain on the car at all times.** Approved vehicles must remain in "as-approved" condition throughout the competition. **Any repairs of a part that is not identical as the broken part must be approved by National Techs prior to the repair. Non-identical parts not approved by the National Techs will be subject to an appropriate performance penalty.** Minor adjustments permitted by the rules and normal vehicle maintenance and tuning are not considered modifications.

2009: 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.

51.2.1 Cost Report

Report Section 3 - Cost Documentation

2010: This section includes copies of receipts, invoices, price tags, catalog pages, on-line prices, or other documentation, to substantiate the costs of the parts and materials of any item costing more than **\$30.** Cost documentation must be at full retail US prices. The report is expected to be comprehensive, well documented, truthful and accurate.

2009: This section includes copies of receipts, invoices, price tags, catalog pages, on-line prices, or other documentation, to substantiate the costs of the parts and materials of any item costing more than **\$20.**

Cost documentation must be at full retail US prices. The report is expected to be comprehensive, well documented, truthful and accurate.

52.5.7 Endurance Event - Penalty Default Values

2010: 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. Note that all time penalties are enforced from when the car is in the black flag area, i.e. the time spent being towed back to the pits does NOT count towards the penalty.

2009: 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.