Baja SAE Technical Inspection Bulletin

2015-1

SAE INTERNATIONAL

Introduction

- This bulletin will cover technical inspection issues experienced during the first competition of 2015 (Auburn).
- This bulletin will also offer guidance on how certain rules will be enforced.
- The 2015 BSAE competition year has several new rule changes.
- It is your responsibility to read the rules and prepare your car accordingly.
- If you are unsure about a rule, you can make use of the Rules Question feature on BajaSAE.net, or ask fellow competitors on the BajaSAE.net forums.

Outline

- Conventional Seats
- Suspension Seats
- Fire Extinguisher Mounts
- Driver Equipment
- Seat Belts
- Fuel System
- Frame
- Tow Points
- Black Flag Statistics

Conventional Seats

- B10.7.1 – “Conventional seats shall be generally rigid…”
  - Over the last few years, some seat failures have allowed the driver to gradually push the firewall rearwards and contact exhaust and drivetrain components.
  - Recall that the seat must work in concert with the safety harness. The seat should be able to withstand the loads imparted on it from the mass of the driver.
  - At BSAE Auburn, a few teams had seats made out of 0.020” firewall material or plastic sheet. These types of seats were not accepted.
  - The firewall will not be accepted as a seat back plane.
  - Teams with questionable seats were requested to bolster or replace their seats such that they had similar rigidity to an aftermarket aluminum racing seat.

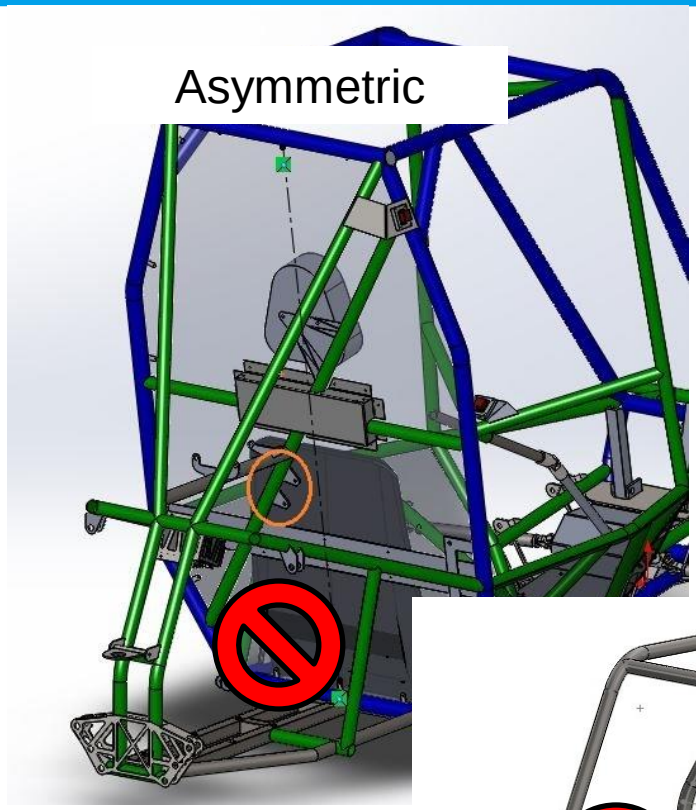
Conventional Seats

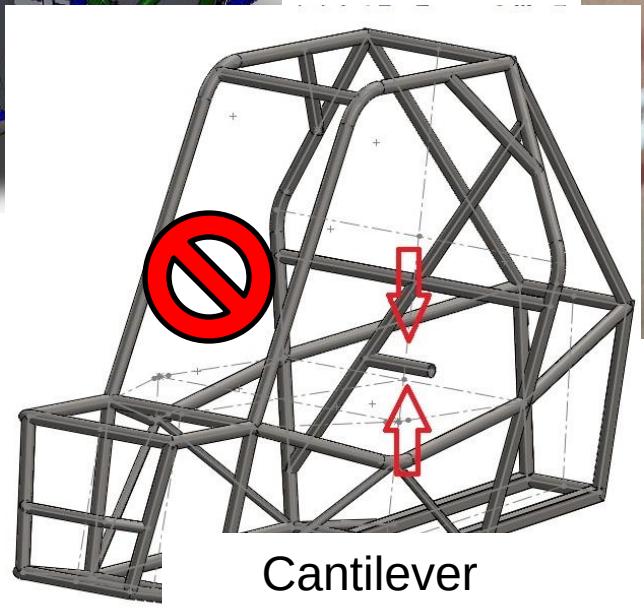
- B10.7.1 – “…and be of metal or composite construction.”
  - Plastics do not qualify as “composite”.
  - Teams with plastic seats were required to purchase or manufacture a metal or composite seat.
  - Over the last several years, many teams that show up with molded plastic racing seats have been required to heavily modify the seat due to belt routing clearance.
  - These modifications compromised the strength of the seat.

Conventional Seats

- B10.7.3 – “…mounting points shall be generally symmetrical about the centerline of the seat itself or the vehicle.”
  - Just as the seat belt mounts are symmetrical, the seat mounting should be symmetrical to evenly distribute loads.
  - Similarly, as cantilevered seatbelt mounts are not allowed, cantilevered seat mounts will not be accepted. This arrangement puts an undue moment on thin-walled frame tubes and does not evenly distribute the load of the driver to the frame.

Conventional Seats





Suspension Seats

- B10.7.1 – “Suspension seats shall be constructed of durable, woven materials. Stitching shall be neat and sufficient to effectively join all seat parts and safely direct forces from the driver to the vehicle frame.”
- Two suspension seats failed during BSAE Auburn 2015.
  - One failure was due to overloaded material (seat made in-house).
  - The second was due to insufficient stitching on webbing (seat professionally made).

Suspension Seats

Suspension Seats

Suspension Seats

- Other suspension seat issues included:
  - Questionable hardware
    - **Carabiners, D-rings, and other hardware** should be load rated and stronger than the webbing material.
    - **Grommets** should be sufficient strength and should not be pulling out of seat material.
    - **Frame tab weld length** should be the same as seat belt tabs.
    - **Webbing buckles** should be appropriately sized for the webbing width and any applied loads.
  - Hybrid seats
    - Will be dealt with on a case-by-case basis.
    - Seat Back Plane issues
    - Seat Bottom Plane issues
  - **All seats (suspension and conventional) are expected to react to the same loads seen by the seat belts.**

Suspension Seats

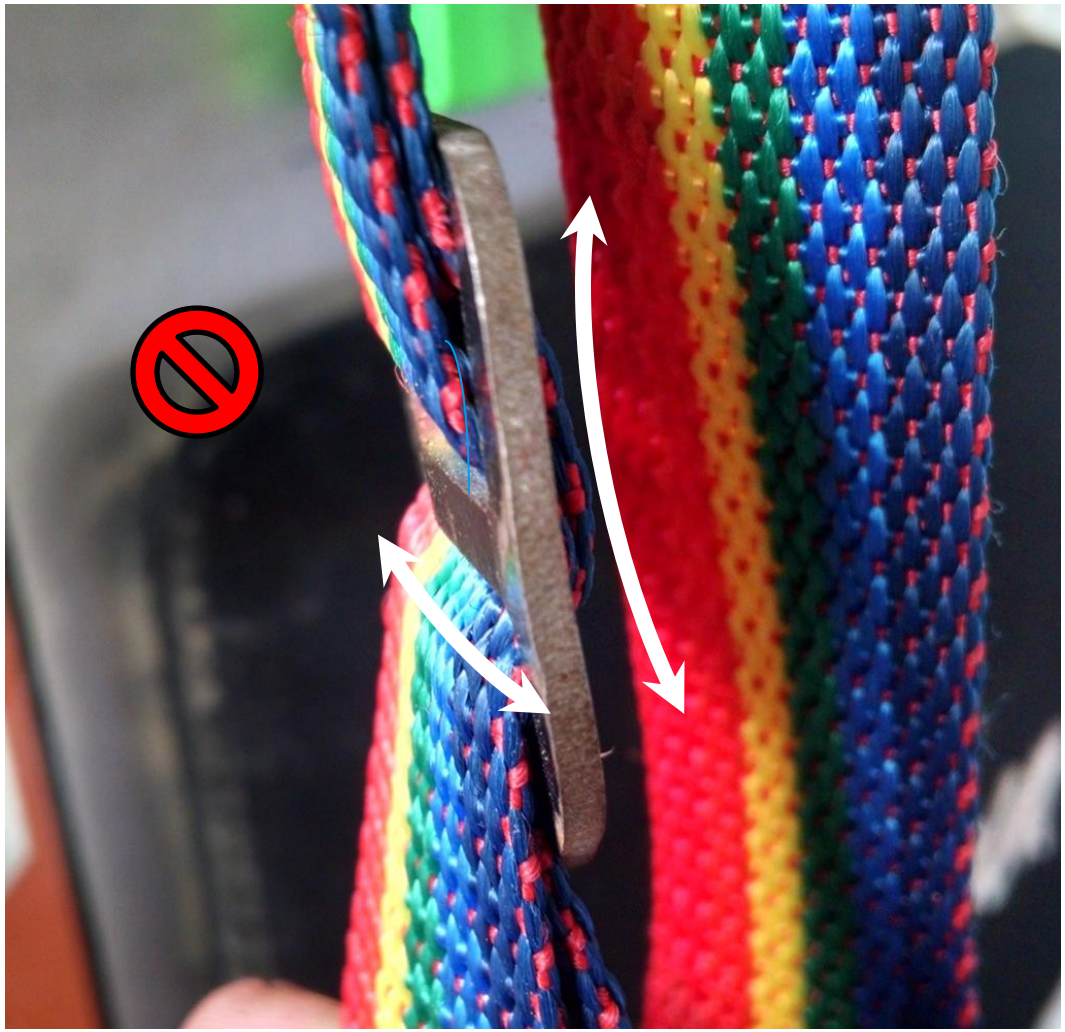
- The seat pictured was a combination of suspension seat (seat bottom plane) and conventional seat (seat back plane)
- This seat did not satisfy requirements for either seat design.
- The seat bottom mounts were not within 2 inches of a frame node (as measured by the center of the webbing.
- The seat back did not have sufficient rigidity to keep the driver properly positioned with respect to the seat belts and from bulging the firewall rearward.
- There have been certain cases in previous years where seat failures allowed the driver to partially pass through the plane of the RRH and come in contact with engine exhaust or drivetrain components.

Suspension Seats

- This grommet was already tearing out before the team arrived at tech inspection.
- Components that are damaged and failed will not be accepted at tech inspection.

Suspension Seats

- The same team as the previous slide also showed up with buckles that were yielded.
- The team was required to change hardware.



Fire Extinguisher Mounts

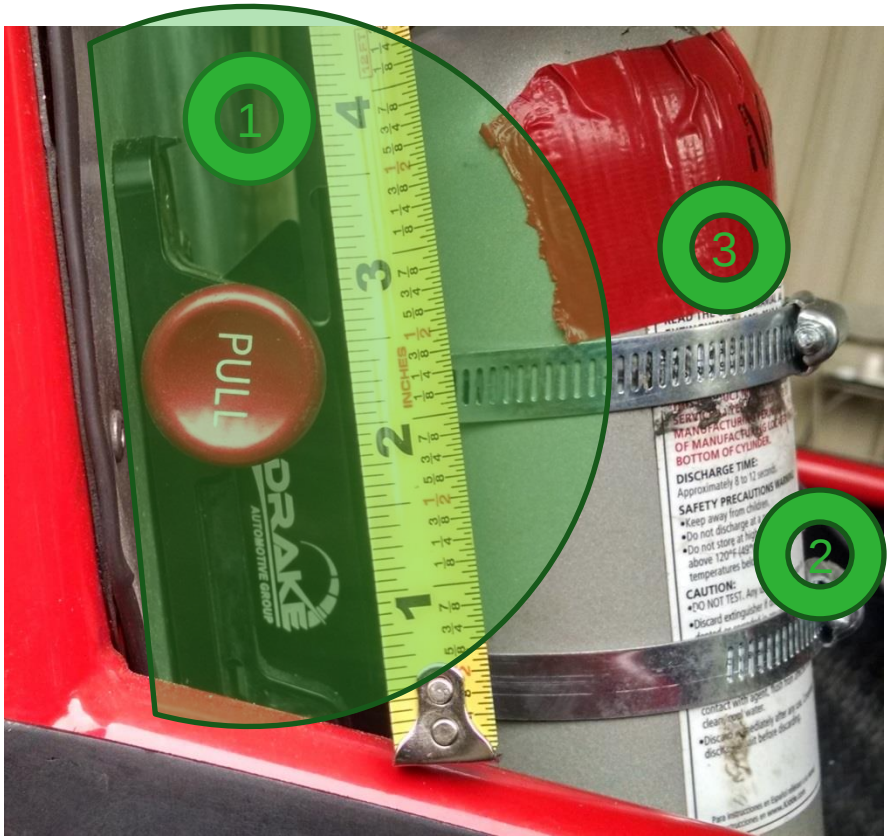
- Overall the new extinguisher mounts worked very well.
- There were a few issues found in technical inspection:
  - Accessibility to pull knob
  - Clamp positioning
  - Proper fasteners
- During the endurance race there were zero fire extinguisher mount failures.

Fire Extinguisher Mounts

1. Appropriate hardware (Flat-head socket head cap screw)
2. Proper clamp routing through notches
3. Clamp hardware positioned away from pull knob.

Fire Extinguisher Mounts

1. Appropriate hardware (Flat-head socket head cap screw)
2. At least 2 inches of radial clearance around knob forward of firewall.
3. Clamp hardware positioned away from pull knob.



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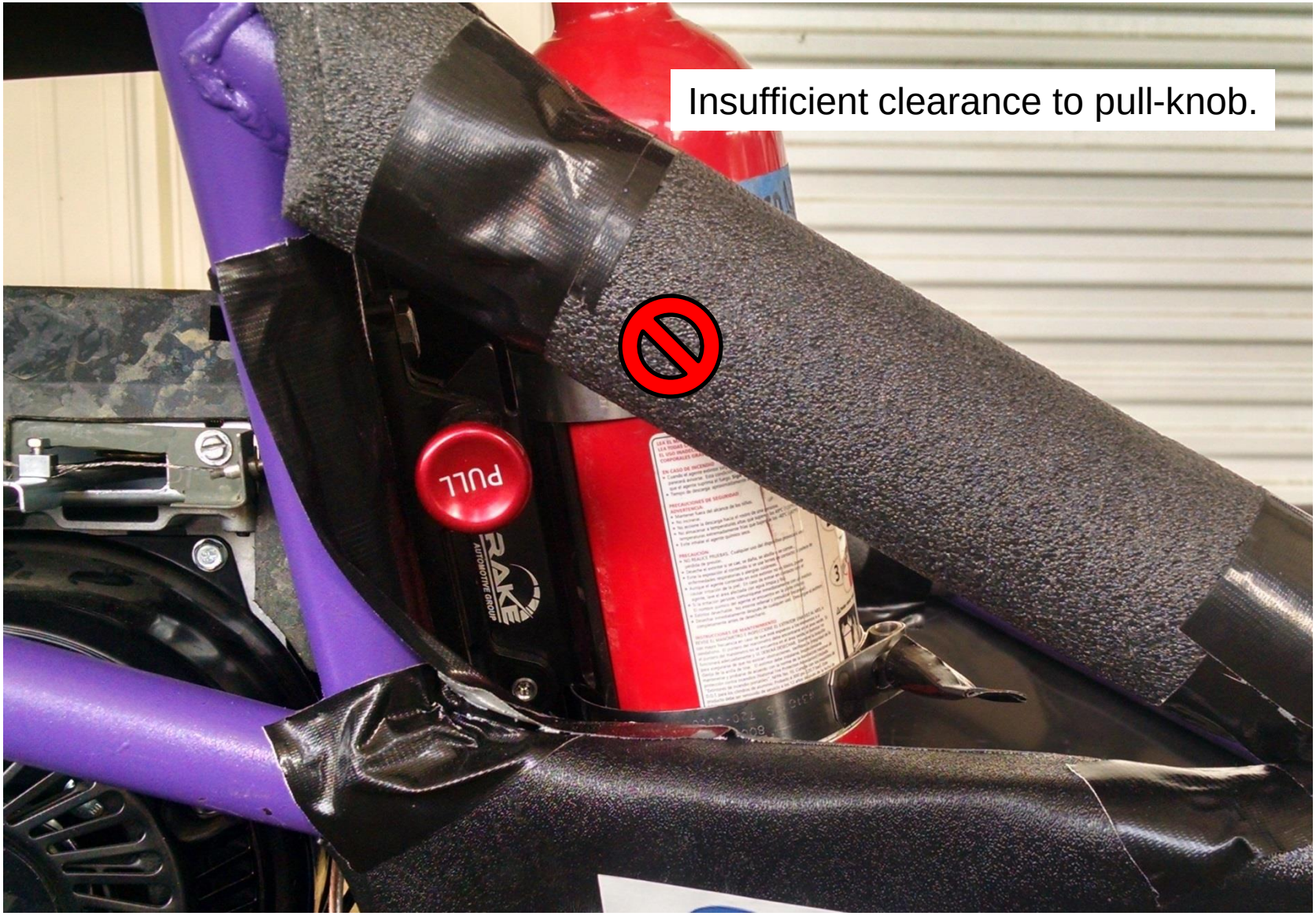


Seatbelts

- During tech inspection and dynamic day, tech inspectors found several cars where the belts were out of adjustment. Belts must have room for all drivers and still have room to be adjusted tight or loose.
- A few teams were required to move their anti-submarine belt mounting point because it was too far forward. Always refer to the installation instructions.
- Some teams still install seat belt tabs in bending. Make sure the seat belt loads are directed to the frame in tension.
- Lap belt angles must be such that forces are directed to the hip bones and not the drivers stomach/intestines.

Driver Equipment

- CHECK YOUR DATES – several teams were sent away because their equipment:
  - Did not have a date tag.
  - Was expired.
- Do not remove any SFI tags.
- Check your helmets for the M2010 sticker under the helmet liner.
- Many date tags are not coincident with the SFI tag. The date tag is sewn on in a different location. See photo in rule B10.5.3
- Wrist restraints must be separate items left-to-right. Wrist restraints joined with a common ring in the center are not acceptable.
- Make sure your wrist restraints have plenty of adjustment to keep your arms within the vehicle.

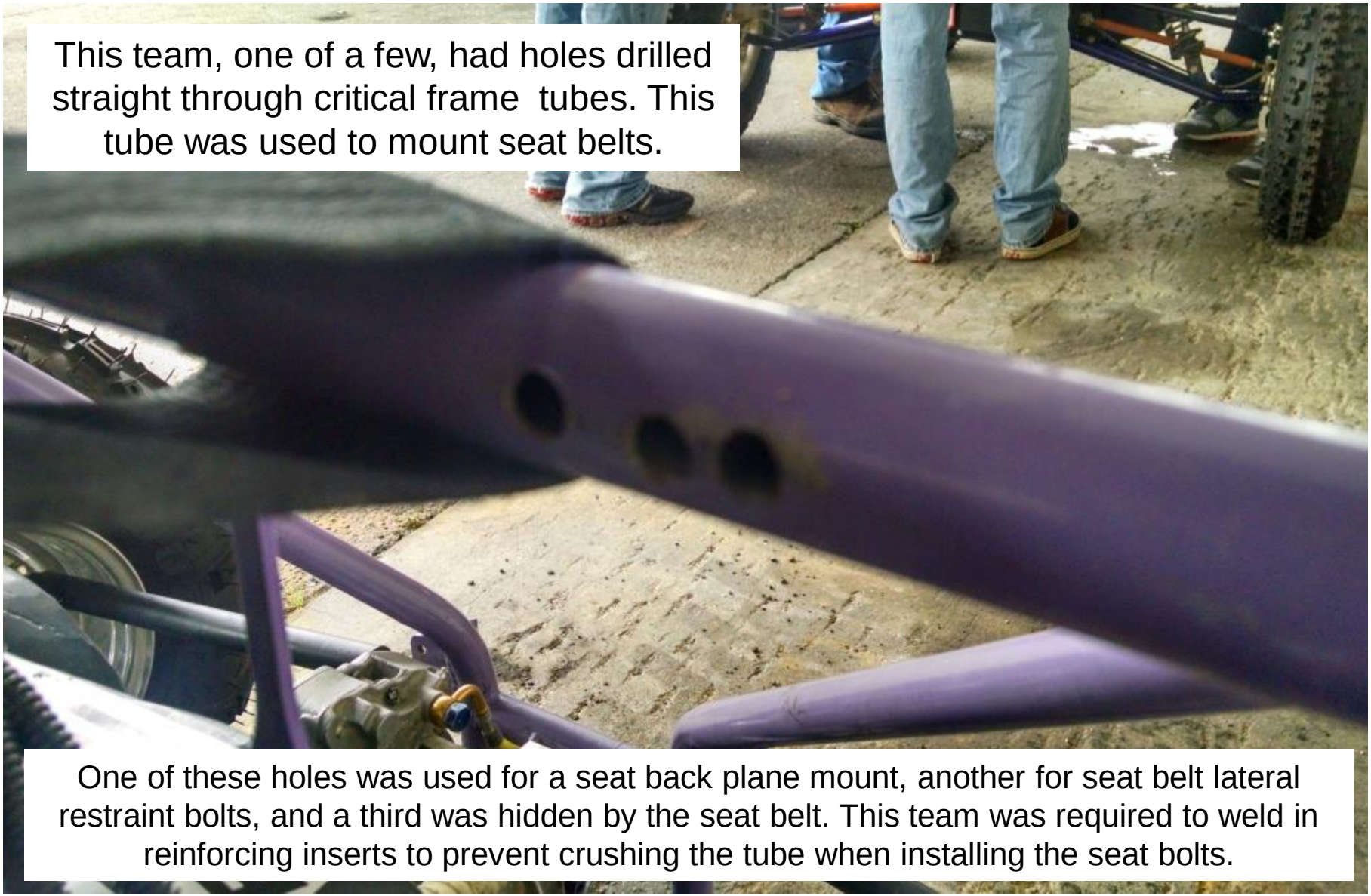
Fuel System

- This plastic splash shield was mounted too close to the muffler and began to sag. If you elect to use plastic splash shields, they must be mounted away from hot exhaust or be made from sheet metal.
- A few teams did not meet the fuel tank mounting tab length requirement. These tabs shall not be longer than 2 inches.

Frame

- You must have all frame documentation available during frame inspection. Online submission for frame pre-check does not count.
- LFS Tubes are PRIMARY members and must be constructed of proper size and material tubing.
- LC between point C on the roll cage must be located at the start of the bend (RHO side). (If RHO and FBM are the same tube.
- Holes in the frame larger than 1/8” need to be reinforced with a welded in sleeve. See next slide for details.

Frame



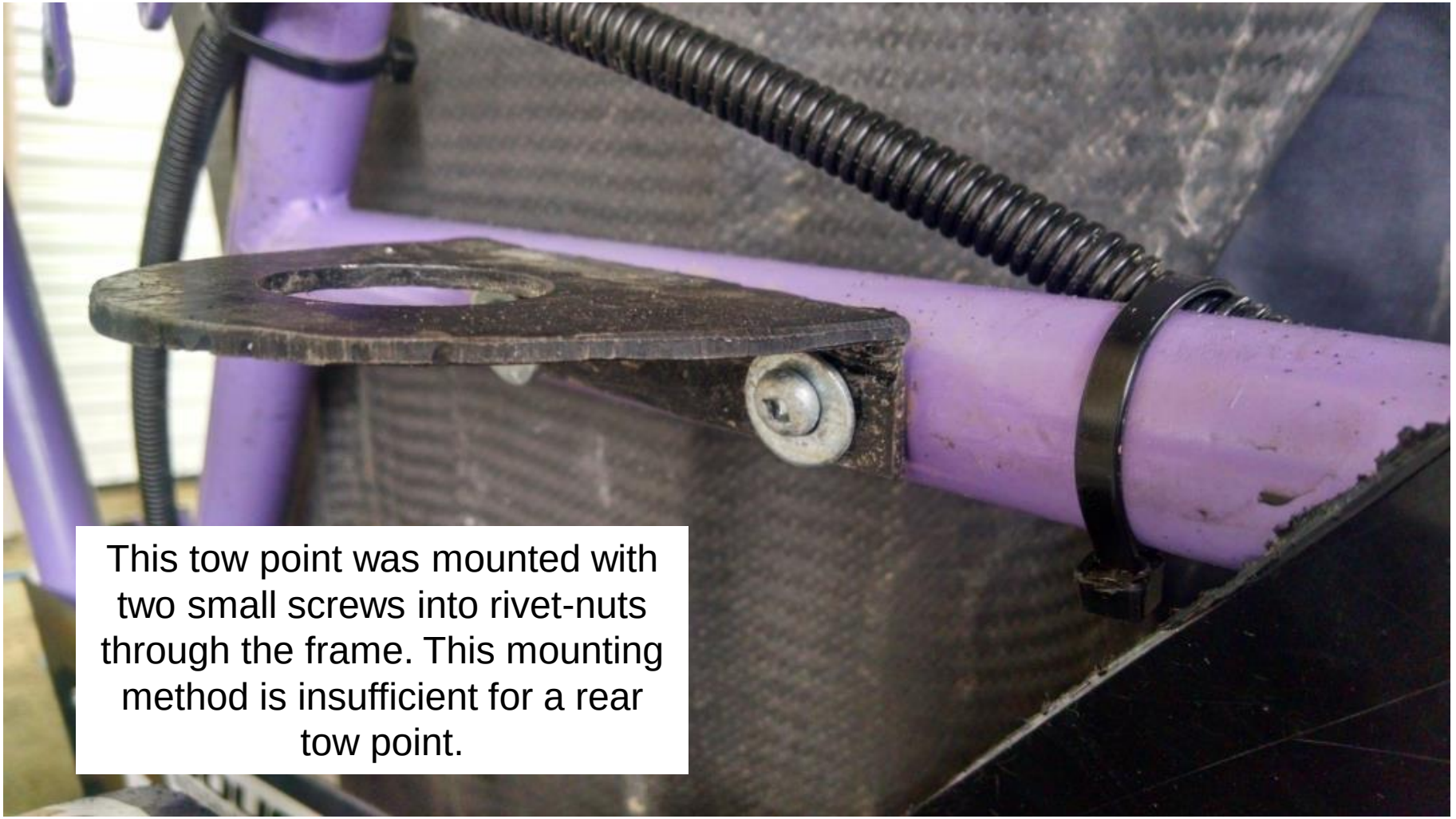
This team, one of a few, had holes drilled straight through critical frame tubes. This tube was used to mount seat belts.

One of these holes was used for a seat back plane mount, another for seat belt lateral restraint bolts, and a third was hidden by the seat belt. This team was required to weld in reinforcing inserts to prevent crushing the tube when installing the seat bolts.

Tow Points

- Many teams did not meet the front tow point requirements. Tech inspection will have a 2” x 8” block that must pass through the front tow point.
- Make sure body panels or numbers do not interfere with the front tow point.
- Make sure the rear tow point is strong enough to serve as a vertical lift point for the vehicle.

Tow Points

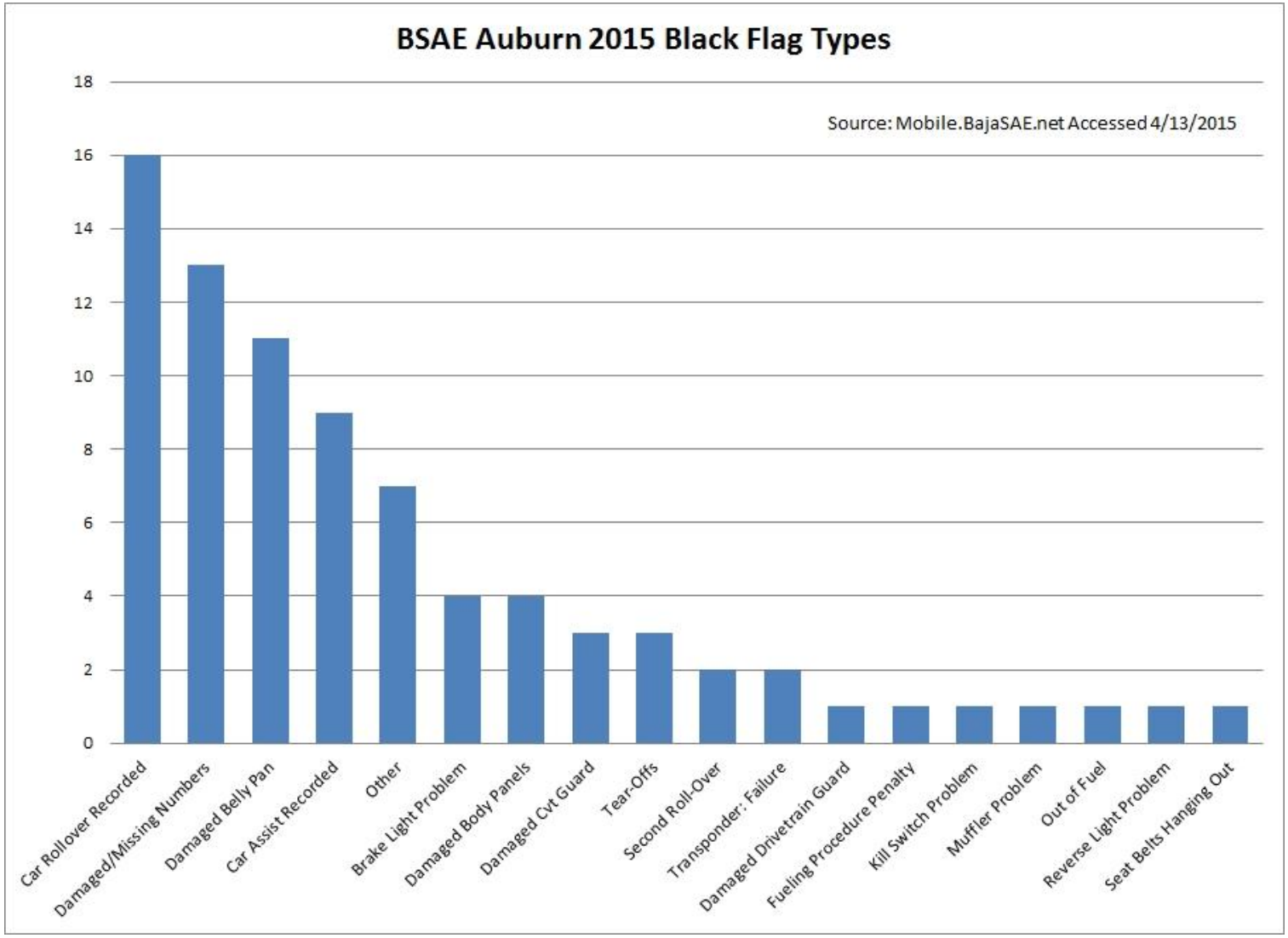


This tow point was mounted with two small screws into rivet-nuts through the frame. This mounting method is insufficient for a rear tow point.

Black Flag Statistics

- DES, Digital Engineering Solutions, creator of BajaSAE.net, the online rules inquiry, and live event scoring has developed new black flag tracking software.
- The software is used by race officials to keep track of penalties and safety issues throughout the race.
- The following slides show details of the over 75 black flag calls made during the endurance race at Auburn.

Black Flag Statistics



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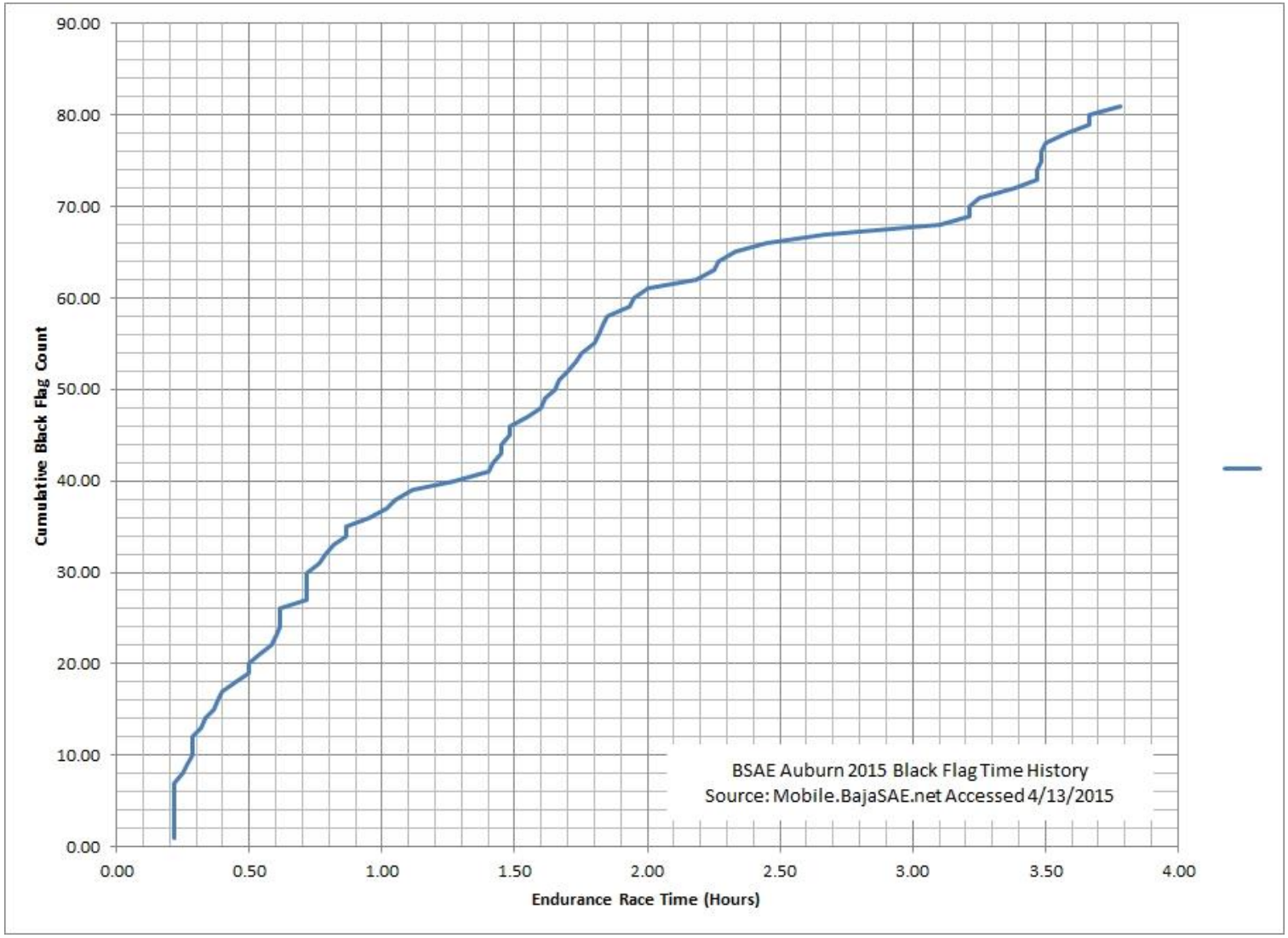
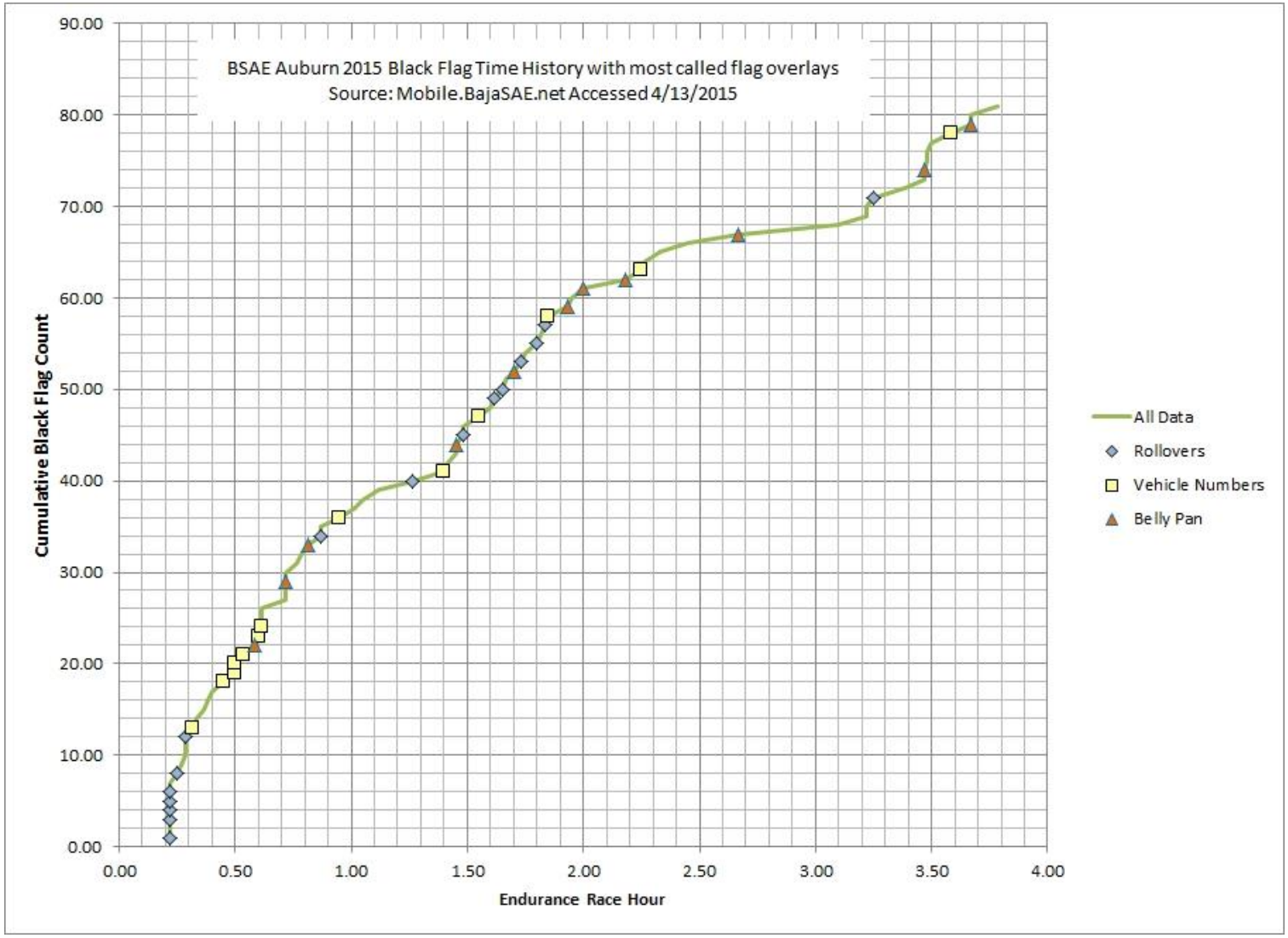


Black Flag Statistics



Summary

- Safety first!
- Check and double check all of your documents, driver equipment, and vehicle safety systems.
- Make use of BajaSAE.net rules inquiries if you are unsure of the interpretation of a rule.
- Make use of BajaSAE.net forums and ask fellow competitors for input.
- Read “A Guide to Successful Baja SAE Technical Inspection” on students.sae.org.
- You are responsible for reading the rule book and preparing your car accordingly.