



The Return of Mini Baja

University Programs Embedded Events

**Mini Baja SAE® Rules
2024
Revision A
01 Jan 2024**

SAE University Programs

At SAE International, we have created the University Programs Portfolio, with our most successful being our Collegiate Design Series (CDS) to provide students with an opportunity to apply what they have learned in their engineering courses in the design and development of a mobility platform. This experiential learning opportunity goes beyond simply building a buggy; students will problem-solve and collaborate while developing communication and project-management skills throughout the implementation of the project. In addition, the CDS series and section events provide industry with opportunities to engage these students and recruit them for internship and employment.

The University Programs portfolio offers university teams an excellent platform for students to learn and demonstrate industry-relevant skills. A current trend in industry is Advanced Manufacturing (AM). As AM grows in adoption, it is our responsibility to embed these skills into our university programs platforms.

From an industry perspective, spatial reasoning skills are highly sought after in employees that are able to visualize objects as they are designing them in virtual environments. A key aspect of a scale vehicle is that the precision fitment of parts required is inversely proportional to the scale of the vehicle, therefore spatial reasoning is more critical as the size of the product decreases. The Mini Baja project will allow team members to develop these skills while creating multiple iterations to determine the best solution.

An Embedded Event

Baja SAE was formerly known as Mini Baja. While we are not turning the clock back, we are taking a new approach to provide additional opportunities for stakeholders from industry and education to engage in an event that embraces AM and everything we love about Baja SAE into a much smaller package.

Student teams are to design, fabricate, assemble, and test a fully functional scale model of their Baja SAE vehicle using AM. This Mini Baja vehicle would be designed on a digital platform with parts fabricated using various AM techniques. The end result is a scale prototype that will be tested in person at SAE International's COMVEC™ Conference in September 2024. The vehicle will be required to navigate a course with various terrain surfaces as well as elevation changes, jumps, drop-offs, and other obstacles to avoid, just like the full-size Baja SAE vehicles.

An added benefit for teams developing a Mini Baja vehicle is that they are able to experiment with different chassis designs, suspension geometries, and drivetrain configurations that would typically be cost prohibitive or too time consuming on a full-scale vehicle. Many of these design considerations are directly transferrable to the full-size Baja SAE vehicle.

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Part A: Administrative Regulations

Article 1 – Mini Baja SAE® Overview

A.1.1 – Preface

As industry develops better Advanced Manufacturing (AM) systems to enhance manufacturing, they look to their future employees to bring knowledge and skills with them that embrace the application of AM.

AM is an industry term that refers to the use of innovative techniques to design and fabricate a product, some of which would be impossible using traditional machine processes. AM techniques include, but are not limited to 3-D printing, CNC milling, CNC lathes, Electrical Discharge Machining, and LASER cutting and welding. Students will be expected to understand and optimize the use of AM as these skills embody the future workforce.

A.1.2 – University Programs Overview

SAE International's University Programs through the Collegiate Design Series (CDS) programs prepare undergraduate and graduate engineering students in a variety of disciplines for future employment in mobility-related industries by challenging them with a real world, engineering application.

Through the Engineering Design Process, experiences may include, but are not limited to:

- Project management, budgeting, communication, and resource management skills
- Team collaboration
- Applying industry rules and regulations
- Design, build, and test the performance of a real vehicle
- Compete with other students from around the globe
- Develop and prepare technical documentation

Students also gain valuable exposure to and engagement with industry professionals to enhance 21st century learning skills, to build their own network, and help prepare them for the workforce after graduation.

A.1.3 – Mini Baja SAE Program Objective

Baja SAE® 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. The students must function as a team to design, engineer, build, test, promote and compete with a vehicle within the limits of the rules. They must also generate financial support for their project and manage their educational priorities.

A.1.4 – Design Subject

Each team's goal is to design and build a 1:10 scale, all-terrain, sporting vehicle that is fabricated using various AM techniques. The vehicle is to be radio-controlled and with energy provided by a rechargeable battery pack. The vehicle should enable teams to test performance concepts in terms of speed, handling, ride, and ruggedness over various terrain. Performance will be measured by success in the static and dynamic events which are described in the Mini Baja SAE® Rules and are subject to event-site constraints. This embedded event is designed to provide additional year-round programming and force teams to utilize AM as an ideal platform for prototyping.

Article 2 - Competition Information

A.2.1 – Competition

SAE International will host this embedded event at the annual COMVEC Conference which will be held at the Renaissance Schaumburg Convention Center in September 2024.

A.2.2 – Official Announcements

Teams are required to read the articles posted on www.bajasae.net/go/news published by SAE International and the other organizing bodies. Teams must also be familiar with all official announcements concerning Rules Clarifications released on the Downloads page on BajaSAE.net. SAE also has the Mobile Baja SAE phone app available on Apple iTunes and Google Play. Competitors are encouraged to download this app to keep up to date with competition news and announcements.

A.2.3 – Official Languages

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

A.2.4 – SAE International Technical Standards Access

A cooperative program of SAE International's Education Board and Technical Standards Board is making some of SAE International's Technical Standards available to teams registered for any US and Canadian Collegiate Design Series (CDS) competition at no cost. The Technical Standards referenced in the CDS rules, along with other standards with reference value, will be accessible online to registered teams, team members and faculty advisors.

A.2.4.1 – Eligibility

To access the standards your team must be registered for a competition in North America and the individual team member or faculty advisor wanting access must be affiliated to the team on SAE International's website (www.sae.org).

A.2.4.2 – Access Procedure

Once registered, a link to SAE MOBILUS will appear to access the technical standards under "Design Standards" on your team's profile page on sae.org, where all the required onsite team information is added. On SAE MOBILUS, you will have the ability to search standards either by J-number assigned or topic of interest such as brake light.

Article 3 – Rules and Organizer Authority

A.3.1 – Rules Authority

The Mini Baja SAE® Rules are the responsibility of the Mini Baja SAE® Rules Committee and are issued under the authority of SAE International. Official announcements from the Mini Baja SAE® Rules Committee, SAE International, or the other Mini Baja SAE® Organizers shall be considered part of and have the same validity as these rules. Ambiguities or questions concerning the meaning or intent of these rules will be resolved by the Mini Baja SAE® Rules Committee or SAE International Staff during competition onsite.

A.3.2 – Rules Validity

The newest revision of the Mini Baja SAE® Rules posted on the BajaSAE.net website and dated for the calendar year of the competition are the rules in effect for the competition. Rule sets dated for other years or older versions of the current year are invalid.

A.3.3 – Rules Compliance

By entering the Mini Baja SAE® competition, the team members, faculty advisors and other personnel of the entering university agree to comply with, and be bound by, the rules and all rule interpretations or procedures issued or announced by SAE International, the Mini Baja SAE® Rules Committee and 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.

A.3.4 – Rules Comprehension

Teams are responsible for reading, understanding, and comprehending the rules in their entirety for the competition in which they are participating. The section and paragraph headings in these rules are provided to facilitate reading; they do not fully explain all the paragraph contents. Questions regarding rules may be submitted by registered users through the rules inquiry feature on BajaSAE.net.

A.3.5 – Rules Questions

Registered teams may submit a rules inquiry on BajaSAE.net.

A.3.5.1 – Privacy

By submitting a rules inquiry on BajaSAE.net, the submitter agrees that both question and the Mini Baja SAE® Rules Committee answer can be reproduced and distributed by SAE International, in edited versions, in any medium or format anywhere in the world.

A.3.5.2 – Duplication

The Mini Baja SAE® Rules Committee will answer questions that are not already answered in the rules or FAQs or that require new or novel rule interpretations. For example, if a rule specifies a minimum dimension for a part, the Mini Baja SAE® Rules Committee will not answer questions asking if a smaller dimension can be used.

A.3.5.3 – Submission

An electronic question submission system has been developed for the North American competitions. The current submission instructions are published on BajaSAE.net, accessible by clicking “Submit a Rules Question.”

A.3.5.4 – Documentation

Teams submitting questions are required to bring copies of the questions and answers with them to technical inspection.

A.3.5.5 – Response Time

Please allow a minimum of two (2) weeks for a response. The Mini Baja SAE® Rules Committee will respond as quickly as possible. However, responses to questions presenting new issues, or of unusual complexity, may take more than two weeks.

Note: Please keep in mind that final operating approval of any Mini Baja SAE® vehicle can only be given onsite at the competition.

A.3.6 – 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 of the competition.

A.3.7 – Participating in the Competition

Teams, team members as individuals, faculty advisors and other representatives of a registered university who are present onsite at a competition are “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. All team members and faculty advisors are required to register with their team as part of their Fast Track Roster (Liability Waiver) and obtain a liability wristband at the registration table onsite. The Fast Track Roster can be found on your team profile page at www.sae.org. Your Fast Track Roster must be printed, signed by all team members, and brought to competition after finalized. Please note: Team members that are attending and not attending competition should be included on the Fast Track Roster.

A.3.8 – Violations of Intent

The violations 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 Mini Baja SAE® Rules Committee or SAE International staff.

A.3.9 – Right to Impound

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

A.3.10 – General Authority

SAE International 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 safe and efficient operation of the event or the Baja SAE® series as a whole.

A.3.11 – Protests and Appeals

It is recognized that students will invest a significant number of hours into the design and construction of a vehicle. In the heat of competition, emotions may peak and disputes can arise. The organizers and SAE International staff will make every effort to fully review all questions and resolve problems quickly and efficiently.

A.3.11.1 – Preliminary Review

If a team has a question about scoring, judging, policies, or any official action, it must be brought to the Baja SAE® Program Manager's attention for an informal preliminary review.

If a team has a question about one of their results/scores they can file a Problem Report using the mobile.bajasae.net website while at the competition site. Additional details about how to file a Problem Report will be available at the competition site or on mobile.bajasae.net. A Problem Report is not a formal protest but should be initiated prior to a formal protest if possible.

A.3.11.2 – Cause

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.

A.3.11.3 – Format and Forfeit

All protests must be filed in writing and presented to the Baja SAE® Program Managers by the team captain or a designated student team member. In order to have a protest considered, a team must post a twenty-five (25) point protest bond, which will be forfeited if the protest is rejected.

Note: SAE International staff, judges or volunteers will not review any video footage as part of the protest.

A.3.11.4 – Protest Period

Protests concerning any aspect of the competition must be filed within 30 minutes of the end of the event to which the protest relates.

A.3.11.5 – Decision

The decision regarding any protest is final.

Article 4 – Participation Requirements

A.4.1 – Students

Teams will be limited to 4 students to participate in Mini Baja for 2024. More students from the same university are welcome to attend COMVEC but will not be allowed to represent their university in an official capacity during the static or dynamic events. All attendees must register to attend the conference at the COMVEC website.

A.4.1.1 – Eligibility

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

A.4.1.2 – Student Status

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

A.4.1.3 – Society Membership

Team members must be members of SAE International or an SAE International affiliate society.

Proof of membership, such as a membership card, may be required at the event registration and check-in.

A.4.1.4 – Age

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

A.4.1.6 – Fast Track Liability Waiver

All onsite participants and faculty are required to sign their team's Fast Track Roster (liability waiver) prior to or upon registering onsite.

A.4.1.7 – Insurance

Individual medical and accident insurance coverage is required and is the sole responsibility of the participant.

A.4.2 – Faculty Advisors

A.4.2.1 – Faculty Advisor Status

Each team is expected and encouraged 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.

A.4.2.2 – Age

Faculty Advisors must be at least eighteen (18) years of age at the time of the competition.

A.4.2.3 – Fast Track Liability Waiver

All onsite participants and faculty are required to sign their team's Fast Track Roster (liability waiver) prior to or upon registering onsite.

A.4.2.4 – Faculty Advisor Responsibilities

Faculty Advisors are expected to advise their teams on general engineering and engineering project management theory.

A.4.2.5 – Faculty Advisor Limitations

Faculty advisors may not design any part of the vehicle nor directly participate in the development of any documentation or presentation.

Faculty Advisors may neither fabricate nor assemble any components nor assist in the preparation, maintenance, testing or operation of the vehicle.

Faculty Advisors are not allowed to participate during technical inspection, cost audit or design presentations. The team captain or other designated members of the team must do all the presenting although Faculty Advisors may silently observe.

Faculty Advisors may not design, build or repair any part of the vehicle.

A.4.3 – Visa Requests

Affiliated team members will have the ability to print out a Registration Confirmation Letter for the individual event(s) that they are attending. Once a student team member affiliates themselves to their team's profile page on sae.org under their individual edit section, they will have the opportunity to print out their personalized letter with the following information: Student's Name, School's Name, the CDS Event Name, Official Dates and Location(s).

Caution: SAE International cannot and will not intervene with, call, send personal letters to, the State Departments, Embassies or Consulates of the United States or other governments on behalf of any meeting or event participant.

Teams requiring visas to enter to the United States are advised to apply at least sixty (60) days prior to the competition. Although most visa applications seem to go through without an unreasonable delay, occasionally teams have had difficulties, and in several instances, visas were not issued before the competition.

Caution: Apply early for visas.

Neither SAE International staff nor any competition organizers are permitted to give advice on visas, customs regulations or vehicle shipping. Nor will they intervene on either matter concerning the United States or any other country.

Article 5 - Vehicle Eligibility

A.5.1 – Student Created

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

A.5.2 – Kit Vehicles Prohibited

Vehicles fabricated from a kit or published designs are ineligible to compete. Vehicles which have been professionally fabricated will be disqualified from the competition.

A.5.3 – Chassis and other Vehicle Parts

Teams must manufacture and fabricate their chassis and all components of the chassis. If a team does not have access to AM facilities with the necessary equipment to complete this work, it is suggested that they partner with a neighboring university or industry partner to fabricate the parts for them.

A.5.4 – Off-The-Shelf Parts

These rules do not exclude the use of prefabricated or modified “Off-The-Shelf” parts of commonly available radio control vehicle components.

A.5.5 – Vehicle Components

While teams are allowed to use some off the shelf parts for their vehicles, a majority of the vehicle components should be designed and fabricated using AM.

Parts that teams can purchase:	Parts that teams should design and fabricate:
<ul style="list-style-type: none">• Transmitters• Receivers• Servos• Motors• Motor Controllers• Batteries• Shocks/Dampers• Wheels• Tires• Fasteners	<ul style="list-style-type: none">• Chassis• Body Parts• Aerodynamic Aids• Suspension Arms• Steering Mechanicals• Linkages• Motor Mounts• Transmissions• Differentials• Enclosures for electronics

A.5.6 - Penalties

Teams violating any of the rules in this article will receive a penalty, which depending on the severity of the infraction, could include disqualification from the competition.

Article 6 - Registration

A.6.1 - Individual Registration

A.6.1.1 - Affiliation

All participating team members must be sure they are individually affiliated to their respective school/university on the SAE International website <https://www.sae.org/participate/membership/join> through their team's profile page for each event in which they are participating.

A.6.1.2 - SAE Membership

If you are not an SAE International member, go to <http://www.sae.org/membership/join> and click Join SAE for Students. Please note all student participants must be SAE International members to participate in the events; this is not mandatory for faculty advisors. Faculty members who wish to become SAE International members should choose an option under the "Professional Membership" link.

A.6.1.3 - Faculty Advisor Affiliation

All faculty advisors who are not SAE International members are required to sign up for an SAE International Customer Account using their email address. Contact collegiatecompetitions@sae.org and provide the Customer Number obtained on my.sae.org and the university name to be correctly affiliated to the university.

A.6.1.4 - Student Affiliation

All student participants and faculty advisors must affiliate themselves to the appropriate school and team roster online.

A.6.1.5 - Required Information

Once students and faculty advisors have associated to their respective university team(s), all affiliated students and faculty must complete all requested information (i.e., Emergency Contact Information) on the team registration page. All team members, including Faculty Advisors, must affiliate **prior** to the competition.

A.6.2 - Team Registration

A.6.2.1 - Online Registration

US and Canadian competition registration for the Mini Baja SAE® event must be completed online. Online registration must be done by either (a) an SAE International member or (b) the official faculty advisor connected with the university and recorded as such in the SAE International database.

The event will take place at COMVEC, SAE International's Commercial Vehicle Conference. Each team should follow these sequential steps to properly register for Mini Baja.

1. The Mini Baja Team Lead should register the entire team for Mini Baja on the CDS Website.
2. After registering for Mini Baja, each team member will need to register to attend COMVEC.
3. Upload each team member's COMVEC Registration Confirmation as a PDF document on CDS Web in the document submission section for Mini Baja by August 16, 2024.

Registration for Mini Baja is FREE, but your team must pay for registration to COMVEC. Student registration for COMVEC is \$175 for each student.

If your team fails to upload your COMVEC Registration Confirmation by the 8/16/24 deadline will be removed from the Mini Baja team registration list.

We are only accepting the first 20 Mini Baja teams to participate due to facility constraints. There will be a waitlist for those teams that register after the first twenty teams.

There will be no On-Site registration at COMVEC for attendance at the conference or Mini Baja.

A.6.2.2 - Restriction

Registration for the Mini Baja SAE® competition is restricted to one (1) vehicle per university. For the inaugural 2024 year, only 20 universities will be allowed to participate. We are placing a 4-member team cap on the number of students per team that can participate in Mini Baja for 2024. The minimum number of team members should be at least two students due to the need for someone to work in the pit lane in addition to the driver.

Note: While only 4 students can be listed as team members and participate in the event, more students from the same university are allowed to attend COMVEC but must register as a student on the COMVEC registration website. There will be no on-site conference registration.

A.6.2.3 - Waiting List

Each competition shall have a waiting list limited to 10 vehicles. The waitlist will remain open until all spots are filled or the closing date and time posted on the specific event website is reached.

A.6.2.4 - Registration Dates

Teams must register for the Mini Baja SAE® competition they intend to enter by the specified date on the action deadline webpage for each competition.

A.6.2.5 - Fees

There are no registration fees for teams to register for Mini Baja. However, each team member is required to be a current SAE Member **and** register for the COMVEC conference.

A.6.2.6 - Withdrawals

Registered teams for the Mini Baja SAE® event that determine they will not be able to attend the competition are required to officially withdraw by emailing collegiatecompetitions@sae.org no later than (4) weeks before the event. This will allow teams on the waitlist to participate if teams ahead of them in registration withdraw if they are unable to attend.

A.6.2.7 - Failure to Meet Deadlines

All teams, both Registered and Waitlisted, for the Mini Baja SAE® competition are required to submit all required documents prior to the competition. The required documents provide evidence their vehicle complies with the rules, supports the technical inspection process, and provides material that the Cost and Design event judges need to evaluate the team during the competition. When these documents are not submitted, the judges cannot properly assess the vehicle or the team.

Teams that do not submit Cost Report, Design Report Slide Deck, and Technical Documents typically do not come to the competition. Teams that do not notify the SAE CDS personnel they are withdrawing from competition create the following problems:

- Teams are still included in the static event schedules and judging time is wasted.
- The unused registration slot cannot be offered to a team on the waitlist.

Additionally, failure to submit the required Cost Report, Design Report Slide Deck, and Technical Documents is a clear violation of the rules. Any blank document submitted to subvert the submission date will be treated as failure to submit.

Therefore, it is the policy of SAE International that failure to submit the required Cost Report, Design Report Slide Deck, and Technical Documents within five (5) days of the deadline will constitute an automatic withdrawal of your team. Your team will be notified by the 5th day that SAE has not received the documents and after six (6) days the team's registration will be cancelled.

A.6.2.8 - Shipping and Customs

SAE International and the Mini Baja SAE® organizers strongly recommend international teams to check with the Customs Service concerning the regulations governing the temporary importation of vehicles. Neither SAE International staff nor the Baja SAE® competition organizers are permitted to provide advice on U.S. Customs matters.

Article 7 - Report Submission

A.7.1 - Required Submissions

All required documents shall be submitted through BajaSAE.net. There will be a Mini Baja menu that includes the standard forms that are required for documentation and submissions.

A.7.1.1 - Sign Up Procedure

To create an account for BajaSAE.net, click "Create an Account," and follow the instructions. All teams require a Team Captain on BajaSAE.net in order to approve additional members. Once the team captain has created an account it will remain valid until the team becomes dormant or no longer registers to compete.

Note - There may be a delay of up to three (3) business days between the time your team registers for a competition and BajaSAE.net recognizes the validity of your authentication number.

A.7.1.2 - Responsibilities and Restrictions

Each team must have at least one person with an account at BajaSAE.net and identified as the Team Captain. The Team Captain(s) have unique responsibilities on the site including accepting other team members for site access. Until the captain accepts a member's signup request that person cannot upload team documents, view team documents, or ask rules questions. Team captains automatically have the same roles and privileges as their team members.

Team Member Restrictions - Team members must be approved by the Team Captain or the Faculty Advisor before being able to view or upload team documents.

Note - All team members are not required to be affiliated on bajasae.net, just the person uploading documents or asking rules questions.

Uploading Documents - All team members and the team captain have equal authority to upload and/or replace documents in the name of the team.

Document Access - Uploaded documents can only be viewed by (1) member of the submitting team, (2) authorized judges, technical inspectors and officials and (3) CDS staff.

Reminder - The website does not know what is intended for submission or what the submitter is thinking.

Anything a team uploads to the site is considered to be an official action by the team.

SAE.org Website Actions

- 1) Update Team Website & Social Media
- 2) Affiliate all members through Team Profile
- 3) Print Registration Confirmation Letter
- 4) Print Fast Track Roster

BajaSAE.net Website Actions

- 1) Monitor News
- 2) Affiliate those Submitting Documents
- 3) Affiliate those Asking Rules Questions
- 4) Ask Rules Questions
- 5) Submit Required Documents

A.7.1.3 - Process

Teams competing in the Mini Baja SAE® competition must submit the following documents online through BajaSAE.net.

- Cost Report
- Design Review Slide Deck (DRSD)
- Technical Documentation

Documents may be uploaded to the website from the time the participant's Baja SAE® online account has been created and approved until the "No Submissions Accepted After Date" (which is 5 days after the due date). Submissions may be replaced with new (updated) uploads at any time before the due date without penalty. Teams have the option to replace uploaded documents with a new file at any time. However:

- Replacements after the "Submission Due Date" and the "No Submissions Accepted After Date" are classified as late submissions and the appropriate penalties will be applied.
- Documents may not be uploaded or replaced following the "No Submissions Accepted After Date."
- The latest and most recent document uploaded will be the document evaluated by judges.

A.7.1.4 - Deadline

Submissions must be received by the due date listed on the Action Deadlines on sae.org. Submission will be acknowledged on the submission website with a visual indicator. Teams should have a printed copy of this acknowledgement available at the competition as proof of submission in the event of discrepancy.

A.7.1.5 - Late Submission / Non-Submission Penalty

Late submission or failure to submit the Design Report Slide Deck and/or Technical Documentation and/or Cost Report will be penalized ten (10) points per day. If either report is received more than five (5) days late it will be classified as "Not Submitted" and your team's registration will be cancelled.

A.7.1.6 - Unsatisfactory Submission

At the discretion of the judges, teams who submit any report that, in the opinion of the judges, does not represent a serious effort to comply with the requirements as listed in these rules will also not compete in the design and/or event, but may at the design judges' discretion receive between five (5) and twenty (20) points for their efforts.

Part B: Technical Requirements

Article 1 – Mini Baja SAE® General Design Requirements

Overview

Teams will design, fabricate, and assemble a 1:10 scale radio-controlled replica of their full-size Baja SAE® vehicle. Teams will use a combination of student designed parts that were fabricated using AM as well as “off-the-shelf” parts to create a functional Mini Baja vehicle that can traverse a wide range of terrain and obstacles. While the current full-size Baja SAE® vehicle is powered by a combustion engine, the Mini Baja SAE® vehicle will feature an **all-electric drivetrain** due to facility constraints.

B.1.1 – General Vehicle Specifications

Mini Baja Vehicle Specifications

1. Each Mini Baja Vehicle is to be a 1:10 Scale replica of the team’s SAE Baja Vehicle.
 - a. The overall width of the vehicle cannot exceed 162mm.
 - b. The overall length of the vehicle cannot exceed 274mm.
 - c. The overall height of the vehicle cannot exceed 254mm.

B.1.2 – Factors of Design

Teams should consider ergonomics and ease of assembly when designing the vehicle. Tool clearance and locations of fasteners should expedite assembly and repairs. Teams should also consider how to securely fasten the battery and battery enclosure within the roll cage, but also ensure quick removal as to expedite changing a battery pack.

B.1.3 – All Terrain Capability

B.1.3.1 – Terrain Type

Mini Baja vehicles must be capable of safe operation over rough terrain including obstructions such as large rocks, gravel, sand, steep inclines and declines, mud, and logs in any or all combinations.

B.1.3.2 – Ground Clearance

All Mini Baja vehicles will be required to have a fully charged (battery pack(s), transponder, etc.) minimum static ride-height ground clearance of 2cm.

B.1.4 – Vehicle Configuration

B.1.4.1 – Wheel Arrangement

The vehicle must have four (4) or more wheels not in a straight line.

B.1.4.2 – Four Wheel Drive / All-Wheel Drive

1. Mini Baja vehicles will be required to have 4-wheel drive (4WD) or all-wheel-drive (AWD).
 - a. The 4WD/AWD system is to be powered by an electric drivetrain.
 - b. The 4WD/AWD drivetrain may use one or two electric motors for propulsion.
2. Demonstration of working 4WD/AWD will be required.
 - a. Teams must pass 4WD/AWD check before the “passed tech” sticker will be issued.
 - b. Teams that do not pass the 4WD/AWD check will incur a non-compliance penalty for the endurance event of 15 points.

B.1.5 – Tires

Tire Specifications

1. Tires may be purchased or donated from a supplier or may be designed and fabricated by the teams using AM techniques using various materials or filaments. TPU and TPE are recommended if you have a printer capable of using this material. If not, it would be preferable to purchase your tires made for RC vehicles to prevent damage to the floor of the facility.
2. Tires should not be made from materials that would create excessive markings on floor surfaces or create obstructions for other vehicles during the rigors of the events.
3. Tires are not allowed to have any external markings from national or international full-scale tire manufacturers. (i.e., BF Goodrich, Continental, Dunlop, Goodyear, Hankook, Michelin, etc.)
4. Tires are allowed to have external markings from scale RC vehicle tire manufacturers. (J-Concepts, Duratrax, etc.) or from a fictitious tire manufacturer, provided that it is good taste (i.e. funny, not vulgar).
5. Teams may use different tires throughout the various events provided that they abide by all of the rules within B.1.5.

Article 2 – Motor Requirements

B.2.1 – Propulsion

B.2.1.1 – Motors

Mini Baja vehicles may be powered by 1 or 2 electric motors. Teams may use any motors typically used for quadcopters or “drones”. These may be brushed or brushless internal rotor (in-runner) or external rotor (out-runner) motor(s). Each team is responsible for determining the size, kV rating, and manufacturer of the motor(s). Teams may NOT use motors that are equal to or exceed the typical 540 motor (or 3660) size for radio-controlled vehicles. Any motor size smaller than 540 is acceptable.

B.2.1.2 – Motor Controller(s)

The electric motor(s) in a Mini Baja vehicle must allow for variable control. Teams may power their motor(s) with one or two electronic speed controllers (ESCs). An ESC will decode signals from the receiver and translate it into variable motor speeds by adjusting voltage and current. Each team is responsible for determining the proper current rating, type, and manufacturer of the ESC(s) to ensure compatibility with their motor(s). ESCs may use Battery Elimination Circuitry (BEC) to eliminate the need for a separate power supply for the receiver.

Article 3 – Battery Requirements

B.3.1 – Battery Pack(s)

The only energy storage system allowed in a Mini Baja vehicle is a *commercially available* 3-cell LiPo battery pack.

1. Teams may use one or two battery packs with a maximum mAh rating of 1800mAh.
 - a. A team can use one 3-cell battery pack with a maximum mAh rating of 1800mAh.
 - b. A team can use two 3-cell battery packs with a maximum mAh rating of 900mAh each.
2. Teams may have multiple battery packs of their selected configuration but are limited to the above restrictions within the vehicle at all times.
3. Teams must leave the manufacturer's original packaging on all battery packs.
 - a. The original packaging must include the number of cells and the mAh rating.
 - b. Teams may not alter the packaging in any way.
 - c. Teams may not assemble/fabricate their own batteries for this event.
4. A 3-cell battery pack will measure a no-load battery voltage of 11.1V fully charged. This will be measured at technical inspection.
5. Teams are NOT allowed to build their own battery pack due to the inherent risk of fire caused by thermal runaway. Teams in violation of this will be disqualified.

B.3.2 – Battery Pack Charging

- Teams must use a fireproof & explosion proof charging bag/box when charging all LiPo batteries. This enclosure is primarily designed to provide protection for the surrounding area if there is a thermal event during battery charging.
- Teams are required to mark their charging bags, battery chargers, and batteries with their school's name and/or their vehicle number. This marking should not be made of flammable material.
- Teams should follow best practices determined by the battery manufacturer as it relates to charging protocol, charge rates, and storage.
- Teams will be required to demonstrate proper safety procedures and equipment during technical inspection.
- Teams will only be allowed to charge their batteries in the designated charging area at the Mini Baja Event.
- **The maximum charge rate for all vehicle batteries on site will be 1.5 Amps.** Teams found exceeding this limit will have 100 points deducted from their final score. There will be 10 chargers utilizing each power strip rated at 15 amps. If teams exceed the charge rate, it will trip the circuit and an investigation will ensue to determine the guilty party.

Article 4 – Battery Pack Restraint

B.4.1 – Battery Pack Restraint

Teams must design, fabricate, and utilize an enclosure within their vehicle that will provide protection for the battery pack(s) in the event of a vehicle collision. This enclosure is primarily designed to provide physical protection for the battery pack(s) to prevent a thermal event caused by impact or physical damage. A cushioning layer inside this enclosure is recommended to provide additional protection. This enclosure cannot be part of the vehicle chassis and must be able to be completely removed from the vehicle. This enclosure may have some venting to allow the battery pack to cool from the ambient air, but the venting should not compromise the structural integrity and protection provided by the enclosure.

Article 5 – Vehicle Controls

B.5.1 – Vehicle Controls

Mini Baja vehicles will be controlled using a Spread Spectrum radio-control system. The radio-control system will use frequencies designated for surface vehicles only. The transmitter and receiver form a unique signal link that mitigates the likelihood of the loss of control of the vehicle due to interference.

B.5.1.1 – Transmitter

The transmitter utilizes inputs from the student driver to the vehicle to adjust for course corrections, direction, and velocity. The transmitter should have a minimum of 2 channel control.

B.5.1.2 – Receiver

The receiver decodes signals from the transmitter into electrical signals that control the steering and propulsion of the Mini Baja vehicle. The receiver should have a minimum of 2 channel control. One channel is designated for the steering servo(s) and the other channel is designated for the ESC(s) to control the motor(s).

B.5.1.3 – Servo(s)

Teams may use one or two servos to provide steering for their Mini Baja vehicle. These servos should be properly sized to provide enough force to adjust the steering of the fully loaded static vehicle.

B.5.1.4 – Motor Controller

See Part B, Article 2 – B.2.1.2

Article 6 – Roll Cage

B.6.1 – Objective

The purpose of the roll cage is to maintain a minimum space surrounding the battery enclosure (B4.1) and to provide a secure and unobstructed location for the timing transponder. The roll cage must be designed and fabricated to prevent any failure of the cage's integrity during normal operation or during a collision or roll over. Teams should design and fabricate their roll cage for their Mini Baja vehicle using AM techniques.

1. The roll cage should accommodate and protect the team's transponder.
2. The roll cage should closely resemble the team's roll cage from their full-scale Baja SAE vehicle.

B.6.1.1 – Integrated Design

AM provides many benefits, one of which is that it can integrate multiple components into one cohesive design that would be impossible to fabricate with traditional methods. Teams are allowed to integrate the roll cage into the chassis and body panels for the vehicle.

B.6.1.2 – Roll Cage Materials

Teams are allowed to utilize any AM techniques they feel will provide them with the best combination of performance, reliability, strength, and value. They are also allowed to choose any materials that will provide the same combination of performance, reliability, strength, and value. Teams will be required to justify and document these decisions in their portfolio.

B.6.1.3 – Sharp Edges

The entire vehicle, including the frame, shall have no exposed sharp edges which might endanger the driver, track workers, or people working around the vehicle while the vehicle is in any attitude (static, dynamic, inverted, etc.).

Article 7 – Vehicle Identification and Markings

B.7.1 - Vehicle Numbers

Vehicle numbers are critical for the organizers and officials to positively identify team vehicles. Teams must design numbers to be visible in all race conditions or keep them clean and conspicuous. Numbers shall not be obscured by any other portion of the vehicle.

Caution: Numbers that are not easily read may be black flagged and might not be scored during the dynamic event.

B.7.1.1 – Vehicle Number Assignment

Teams registered for Mini Baja will use the numbers assigned to them upon registration. Vehicle numbers are assigned by SAE as part of the online registration for all U.S. and Canadian Baja SAE® competitions. Numbers shall be assigned by criteria determined by SAE CDS staff. Assigned numbers may be found on the Baja SAE® website in the "Registered Team List" for each competition.

B.7.1.2 - Required Numbers

Three primary numbers are required to be securely affixed to the car. The vehicle's number shall be readily visible from the left side, right side, and the front of the vehicle and strongly contrast with the number's background color.

B.7.1.3 - Required Font

Vehicle numbers shall be displayed in either the “Highway Gothic Regular” font or “Century Gothic Bold” font. No other fonts are permitted. Examples of both fonts are given below.

Highway Gothic: 1 2 3 4 5 6 7 8 9 0

Century Gothic Bold: 1 2 3 4 5 6 7 8 9 0

Approved vehicle number font examples.

B.7.1.4 - Location

B.7.1.4.1 - Side Numbers

Side numbers, mounted to the left and the right sides of the vehicle. Side numbers shall not be visually obstructed by any part of the vehicle.

B.7.1.4.2 - Front Number

The front number can be mounted to the front horizontal surface (hood) near the junction of the roll cage. It is not recommended to mount any numbers on the top of the roll cage as that would obscure communication between the transponder and the timing system.

B.7.1.5 - Orientation

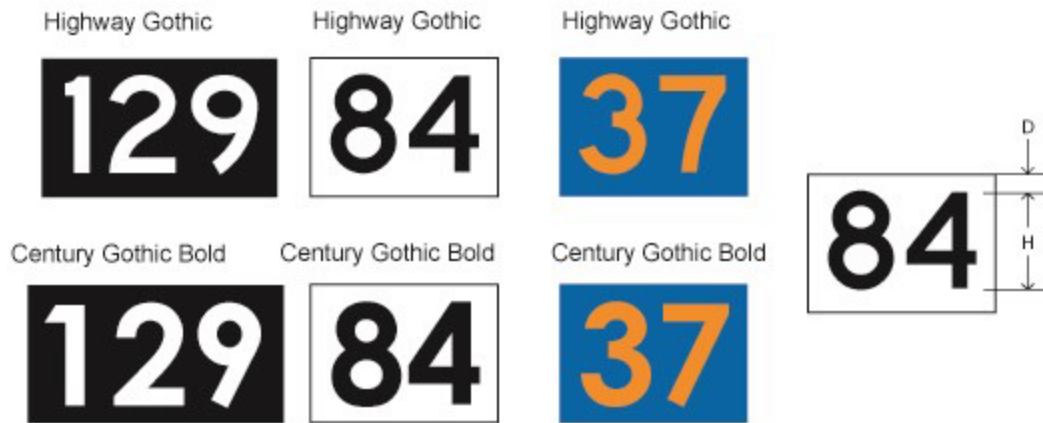
Numerals shall be aligned along a common horizontal line, and the entire number panels shall be mounted in a horizontal orientation (+/- 3.0 degree tolerance) to facilitate fast vehicle identification.

B.7.1.6 - Number Size

The primary numbers must be at least 2.54 mm (1.0 in) high. The primary numbers shall have a stroke width in proper proportion to the font design for the given character height. The number panels shall have approximately 2.5 mm (0.1 in.) spacing between numerals.

B.7.1.7 – Number Background

Each number on the vehicle shall have a highly contrasting background to facilitate easy reading. The edges of the background shall be no less than 5.8 mm (0.2 in.) from the edge of the numbers (dimension “D” in Figure B-70). Numbers may be outlined to provide enhanced contrast. Number backgrounds must be securely fastened to the vehicle frame. Some 3D printers have the capability to print two different color filaments on a single part. Using one color filament for the background and one contrasting color filament for the raised numbers is an acceptable use of Advanced Manufacturing to meet the design requirements. Numbers and backgrounds for Mini Baja do NOT have to be made separately as they do for the full-size Baja SAE vehicles.



B.7.1.8 - Number Color

Teams are free to select their own number and background colors, provided that the colors are high contrast and facilitate fast vehicle identification. The number background shall be all one color and all numerals shall be a matching color though contrasting with the background.

B.7.2 - SAE International Logo

Two (2) SAE International logos must be displayed on the vehicle in prominent locations. These will be distributed during registration at the competition. A flat and smooth area of 12.7mm (.5in) H x 12.7mm (.5in) W should be left available for the location of the SAE International logo.

B.7.3 - 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 or SAE Logo. SAE International may require all entrants to display advertising from the competition sponsors.

B.7.4 – Transponders

All vehicles must be equipped with an iLaps transponder. The transponders will be provided for teams at the event and are to be returned to SAE staff at the conclusion of the event. The transponder is to be mounted at the very top of the roll cage with no obstructions above it as this will prevent it from communicating with the timing system.

Visit <https://www.rclapcounter.com/> for more information on the transponders and timing system we will be using for this program.

All vehicle transponders shall be mounted in the proper location, correctly oriented, and using sufficient fastening methods. Proper mounting systems include zip-ties, double-sided mounting tape, or creating a custom transponder mount using advanced manufacturing techniques. Improper methods include the use of epoxy, CA glue, hot glue, etc.

Failure to return the transponder or damage to your assigned transponder will result in a fine of \$50 which is due before leaving the venue. If a team leaves the venue without payment of the initial fine, an additional \$50 fine will be leveled against the team.

B.7.4.1 – Orientation

The transponder shall be installed along the same plane as the top of the roll cage.

B.7.4.2 – Location

The transponder shall be mounted in the Mini Baja vehicle cockpit, within the roll cage, to prevent it from being damaged in case of a rollover. The transponder shall have an open, unobstructed path between the emitter on the top of the transponder and the receiver of the timing system. The timing system will consist of a bridge that has a lap counting set of receivers mounted on the underside of the bridge. The transponders must have a clear "line of sight" path from the emitter mounted within, but at the top of the roll cage and the receivers mounted to the underside of the bridge.

B.7.4.3 – Interference

The Radio Control system is unlikely to cause harmful interference with the signal transmitted by the transponder. Nevertheless, care should be taken when locating the RC system near the transponder.

B.7.4.4 – Powering the Transponder

If the Electronic Speed Control (ESC) has battery eliminator circuitry (BEC), the radio receiver should have a vacant (BATT) connection that can be used to power the transponder. If the ESC does not have BEC, the transponder will need to be connected to an auxiliary battery with a minimum of 4 Volts and a maximum of 6 Volts. The transponder uses a standard servo connector, also known as a Futaba "J" connector. Regardless of the wiring of your vehicle, you need to verify that it can accept the standard servo connector and that it is connected with the correct polarity.

Because teams will be required to use the provided transponders, it is HIGHLY RECOMMENDED that teams make the radio receiver accessible to install the connector.

B.7.4.5 – Responsibility

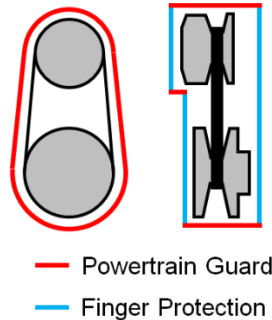
The transponder is the ONLY way that the race committee will be recording laps. It is ultimately the team's responsibility to design the wiring system for their Mini Baja vehicle to provide proper energy to the transponder and to mount the transponder in a safe and secure location. Therefore, if a team is negligent in providing power or securing the transponder so that it cannot provide a signal to the timing system, the laps will not be recorded.

Article 8 - Powertrain Guards

B.8.1 - Powertrain Guard Function

All powertrain components shall be guarded and shielded to prevent injury to the driver, track workers, or bystanders.

Powertrain guards shall perform one or more of the following functions: protect against hazardous release of energy, provide pinch point and entanglement protection, protect against dirt or water intrusion, or protect against release of lubricating oil from gearboxes.



Powertrain Guard Extent example on a CVT

B.8.2 - Hazardous Release of Energy (HROE)

Powertrain guards shall safely dissipate a sudden, hazardous release of energy from powertrain components in the radial and tangential directions. HROE guards shall be durable and mounted with sound engineering practices. HROE guards shall extend around the entire periphery of the guarded components.

B.8.2.1 - HROE Guard Materials

All HROE guards shall be constructed of impact resistant materials such as polycarbonate, though teams may determine the material they will use provided that meets impact safety requirements.

B.8.2.2 - HROE Guard Features

B.8.2.2.1 - Belt, Gear, and Chain Drives

HROE guards shall be a continuous band of energy absorbing material extending around the entire periphery of the drive assembly. The width of the continuous band shall be wider than the entire width of the rotating component.

HROE guards may contain ventilation ports along the path of the guard. Ventilation ports shall be constructed from the same material as the guard, be arranged in such a manner that no radial or tangential path exists for flying debris to exit the ventilation port. The ventilation port shall also be constructed to NOT allow a searching finger to contact the rotating components when the ventilation tube is removed.

B.8.2.2.2 - Driveshafts

Driveshafts, also known as prop shafts, typically rotate at speeds faster than the drive axles and distribute power to front and rear differentials.

If a team elects to use only one motor for the propulsion of the Mini Baja Vehicle, they will be required to provide adequate enclosure for the driveshaft to prevent injury, wire entanglement or other obstructions.

B.8.3 - Pinch Points and Entanglement (PPAE)

Pinch point and entanglement guarding shall prevent clothing and/or searching fingers from contacting or becoming injured in rotating parts. PPAE guarding shall be resilient and be mounted with sound engineering practices.

B.8.3.1 - PPAE Guard Materials

PPAE guarding shall be constructed from rigid, resilient materials. Fabric or other similar materials are explicitly prohibited.

B.8.3.2 - PPAE Guard Features

PPAE guarding for belt, gear, and chain drives shall cover all directions that HROE guard does not protect. PPAE guarding may contain holes or slots for ventilation.

Fastening methods of PPAE guards may consist of threaded fasteners, zip-ties, or quick release latches. Temporary fastening methods such as hook-and-loop fasteners or adhesives are explicitly prohibited.

B.8.3.2.1 – Belt, Gear, and Chain Drives

Belt, gear, and chain drives shall have PPAE guarding.

B.8.3.2.2 – Driveshafts

All driveshafts shall have PPAE guarding.

B.8.3.2.3 – Axle shafts

Axle shafts and associated CV or universal joints directly connecting the front or rear wheels/uprights to the front or rear differential are exempt from the requirements of this article. Portal hubs/uprights are permitted.

B.8.4 – Exemptions

If a motor is attached directly to a differential (or other drivetrain system) and the driveshaft is **NOT** exposed in **ANY WAY**, HROE and PPAE guards are not required in that instance.

Article 9 – Electrical System

A minimum electrical system comprising of at least one battery, at least one electric motor, at least one Electronic Speed Control (ESC), at least one servo, a receiver, and associated wiring is required. The vehicle electrical system shall be designed, installed, and assembled in accordance with good engineering and electrical practices.

B.9.1 - Power Sources

The only acceptable power source for this vehicle is the battery configurations described in Article 3. All batteries shall be mounted within a battery pack enclosure, as stated in Article 4, with sound engineering practices and not come loose during normal operation, a collision, or rollover. Battery connections shall be insulated and protected against an electrical short as a rapid discharge may cause a thermal event.

B.9.2 - Wiring and Connectors

All vehicle wiring and connectors shall be cleanly and neatly installed. Wiring shall be routed away from sources of excessive heat, abrasion, chafing, and possible short circuiting. Wiring connections should demonstrate accepted practices of low voltage systems with appropriate connectors, soldering, and insulators. Electrical tape is not acceptable and will not pass technical inspection.

B.9.3 - Data Acquisition

Vehicles may be equipped with data acquisition (data logging) systems. Data acquisition systems may be excluded from the cost report.

Article 10 - Fasteners and Attachments

B.10.1 - Fasteners

B.10.1.1 – Captive Fasteners

Nylon Locknuts shall be the standard captive fastening system for threaded fasteners. The use of lock washers and/or thread sealants do not satisfy the requirements of this rule. The use of thread sealant for a set screw application is the only exception to this rule.

B.10.1.2 – Threaded ADM Components

Teams are allowed to use threaded components produced through AM.

- If the AM product is metal, the team may elect to use a tap or die to post-process the threads.
- If the AM product is plastic, the team is required to use a tap or die to post-process the threads.
 - It is recommended that the plastic product not have threads as part of the fabrication process.
 - This process would include the use of a hole with a smaller diameter than the threaded component followed by drilling and tapping during post-processing.
 - This process would also include the use of a post with a larger diameter than the threaded component followed by using a threaded die during post-processing.

B.10.1.3 – Commercially Available Fasteners

Teams are allowed to use any commercially available fasteners from any manufacturer or retailer. The purchase and inclusion of any commercially available fasteners are to be documented in the cost analysis.

Article 11 – Combustible Liquids

B.11.1 – Combustible Liquids

Teams are allowed to bring commercially available lubricants that may be classified as combustible.

B.11.2 – Combustible Liquid Storage

All teams must transport and store any combustible liquids in a sealed metal container with a clasp. Teams must design and fabricate a system that will store the combustible liquids upright while in the metal container.

Teams are required to mark their metal container with their school's name and/or their vehicle number. This marking should not be made of flammable material.

B.11.3 – Combustible Liquid Documentation

Any combustible lubricants must be accompanied by the appropriate Safety Data Sheets. All SDS information will be **printed and bound** in a **blue 3-ring binder**.

B.11.4 – Forbidden Combustible Liquids

No other combustible liquids, other than commercially available lubricants, will be allowed on site. Offending teams will be disqualified immediately.

Part C: Static Events

Article 1 – Mini Baja SAE® Static Events

C.1 – Scoring Summary

C.1.1 – Overview

All teams are expected to participate in all static judging and may be excluded from dynamic events if they do not participate in static events.

Static Event	Points
Design Evaluation	150
AM Evaluation	100
Drivetrain	50
Cost Evaluation	50
Innovation	50
Total	400

Article 2 - Technical Inspection

C.2.1 – Overview

All Mini Baja SAE® vehicles shall 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 SAE® rules. If vehicles are not ready for technical inspection when they arrive at the inspection site, they will be sent away. Teams sent away must prepare their vehicle accordingly and return to the inspection site ready for inspection. Any vehicle may be re-inspected at any time during the competition and correction of any non-compliance will be required.

C.2.2 – Preliminary Inspection

SAE Technical Inspectors will conduct a preliminary inspection of the battery packs, transmitters, and transponders of all vehicles.

Each team must bring the following items to inspection:

- Preliminary Inspection Sheet (properly completed)
- Mini Baja Vehicle
- Transponder
- Radio transmitter and receiver

Preliminary inspection will consist of three (4) separate parts as follows:

C.2.2.1 – Preliminary Inspection Sheet

The Preliminary Inspection Sheet will be available on CDS Web after the registration deadline.

C.2.2.1.1 – Pre-Inspection Requirements

Before bringing their vehicle to technical inspection each team must

- Pre-inspect the vehicle for compliance with the rules.
- Complete the official Preliminary Inspection Sheet.
- Have the completed Preliminary Inspection Sheet signed by the faculty advisor and team captain.

Teams presenting Preliminary Inspection Sheets that are incomplete, inaccurate (i.e. do not correspond to the actual condition of the vehicle), are found to have items not in accordance with the rules, or do not represent a serious effort at pre-inspection will have 25 points deducted for each infraction.

C.2.2.1.2 – Inspection Sheet Version

Teams must download the most current version of the Preliminary Inspection Sheets within two weeks of the competition and thoroughly inspect their vehicle in accordance with the technical inspection sheet.

C.2.2.2 – Battery Inspection

Vehicles must be presented for inspection with the battery pack(s) disconnected and removed from the vehicle and battery pack enclosure for testing. Each battery will be measured for no-load voltage and pack(s) inspected for compliance with battery capacity limits.

C.2.2.3 – Transmitter Inspection

Vehicles must be presented for inspection with the receiver installed in the vehicle and “linked” with the transmitter. The transmitter will be inspected to verify that it is a spread-spectrum surface frequency.

C.2.3 – Vehicle Inspection

Each vehicle will be inspected to determine if it complies with the requirements and restrictions of the Mini Baja SAE® rules. If a vehicle fails to pass any part of the inspection, it must be corrected and brought into compliance with the rules before the vehicle is permitted to operate.

C.2.3.1 – Transmitter/Receiver Link Check

At Transmitter/Receiver Link Check, the vehicle battery pack(s) will be connected and the Transmitter & Receiver will be tested for functionality before the vehicle is allowed to proceed.

C.2.3.2 – Drivetrain Check

Each vehicle must demonstrate its ability to operate all four wheels under power. If teams are using a single motor to propel the vehicle, they must demonstrate to the inspector that the driveshaft is properly enclosed.

C.2.3.3 – Steering Check

Each vehicle will have its steering dynamically tested. This is to ensure that all steering components work as intended and can effectively actuate the steering system in a fully loaded vehicle (battery pack(s), transponder, etc.) while it is in a static condition. While the course may comprise of various terrain surfaces, the steering check will be on a smooth surface like a table.

C.2.3.4 – Suspension Check

Each vehicle will have its suspension dynamically tested. This is to ensure that all suspension components work as intended and do not actively leak substances onto the course.

C.2.3.5 – Design Envelope

Each vehicle will be measured to verify it is within the physical design envelope. Technical inspectors will check for the following dimensions:

- a. The overall width of the vehicle cannot exceed 162mm.
- b. The overall length of the vehicle cannot exceed 274mm.
- c. The overall height of the vehicle cannot exceed 254mm.
- d. The fully loaded vehicle ride height cannot be less than 2cm.

C.2.4 – As Approved Condition

Once a vehicle has passed technical inspection, its configuration may not be modified. All accessory components such as batteries, roofs, wings, bumpers, tires, etc. are considered part of the configuration and must remain on the vehicle and stay within the rules and design constraints at all times. If teams make changes to a vehicle which constitutes a rules violation, that team will receive a score of zero for the dynamic events.

C.2.4.1 – Repairs

Approved vehicles must remain in “as-approved” condition throughout the competition. Any repairs of a part that is not identical to the broken part must be approved prior to the repair. If a team needs to replace a part or assembly that was damaged during a dynamic event, they need to find an official technical inspector and demonstrate that the broken parts or assembly are identical to the replacement parts or assembly.

C.2.4.2 – Non-Matching Components

Non-identical parts not approved will be subject to an appropriate performance penalty and may be cause for disqualification.

C.2.4.3 – Tuning

Minor adjustments permitted by the rules and normal vehicle maintenance and tuning are not considered modifications provided that the vehicle stays within the design constraints.

C.2.5 – Penalties

Teams not passing Technical Inspection by 12:30 PM local time on the dynamic event day shall have their design evaluation score changed to zero (0) points and will not be allowed to participate in the dynamic events.

Article 3 – Design Evaluation

C.3.1 – Objective

The objective of the engineering design evaluation event is to evaluate the engineering effort and the use of AM that went into the design of the vehicle and how the engineering meets the technical design rules and specifications, as detailed in the A.1.3 – Mini Baja SAE Program Objective and the A.1.4 – Design Subject. Students will be judged on the creation of design requirements and the ability to meet those requirements, computer aided drafting, analysis, testing and development, manufacturability, serviceability, system integration and how the vehicle works together as a whole. Each of these parts of the engineering product development cycle will be judged within the following subsystems: Suspension, Steering, Drivetrain/Powertrain, and Chassis.

The vehicle that illustrates the best use of engineering to meet the design goals and the best understanding of the design by the team members will win the design event.

Teams are reminded that Mini Baja SAE® is an engineering design competition and that in the Engineering Design Event, teams are evaluated on their design. Components and systems that are incorporated into the design as finished items are not evaluated as a student designed unit but are only assessed on the team's selection and application of that unit. For example, teams that design and fabricate their own shock absorbers (dampeners) are evaluated on the design of the shock absorber as well as the shock absorber's application within the suspension system. Teams using commercially available shock absorbers are evaluated only on selection and application within the suspension system.

C.3.2 – Design Metrics

A major focus of Mini Baja is to provide students with various AM processes. The design metrics of Mini Baja reflect the change of focus from the full-size Baja SAE program.

The engineering design event consists of Design Evaluation judging in which industry professionals will interview each team with a series of questions to determine an appropriate score based on the responses to the questions.

C.3.3 - Design Documents

C.3.3.1 - Overview

The design evaluation judging will be enhanced through the use of a Design Review Slide Deck (DRSD). The DRSD will be reviewed by the design judges during static judging as teams use it to help explain their design considerations for the Mini Baja vehicle.

C.3.3.2 - Document Submittal

The DRSD must be submitted electronically in Adobe Acrobat Format (PDF). The document must be a single file (text, drawings and optional content are all inclusive). The maximum size for the file is 25 MB.

C.3.3.3 - Format

SAE will not provide a template for the DRSD. It will, however, have a format that describes the minimum requirements for content to be included in the slide deck. It is up to the teams to include enough visual content to convey to the judges the various considerations in developing the Mini Baja vehicle.

DSRD Format Minimum Requirements:

Introduction Slide

- Title: Mini Baja 2024

- School

- Team Members

Design Slides

- Renderings of major components (multiple parts can be combined onto one or more slides).

- Rendering(s) of assemblies.

- Animations of simulations.

- Any necessary data and graphs.

Cost

- Bill of Materials

- Receipts of purchased components.

 - If components are donated, the MSRP of the product should be used.

- Cost Reduction Report

AM Application

- Photos of the various AM techniques used during fabrication.

Technical Drawings

- Isometric Line Drawing of the Assembled Vehicle

- Orthographic (3-View) Line Drawing of the Assembled Vehicle

 - Format and layout must follow standard drafting practices.

 - Includes the following general dimensions:

 - Overall Length, Width, and Height.

 - Wheelbase, Track, Ground Clearance

 - Wheel and Tire Diameter

 - Notes denoting location of the following:

 - Battery

 - Transponder

 - Motor(s)

 - Servo(s)

Closing slide

C.3.4 – Design Evaluation

The design judges will evaluate the engineering effort based upon conversations with each team and the team's DRSD, the design presentation, responses to questions, and an inspection of the vehicle (if applicable).

C.3.4.1 – Support Material

Teams are encouraged to bring with them to Design Evaluation any sample components or other materials that they believe are needed to support the presentation of the vehicle and the discussion of their development process. Use of laptop computers or tablets is highly encouraged. Projectors may not be used due to facility constraints. The burden of proof is on the students and the design score will reflect not only the student's ability to properly articulate and communicate their engineering effort but must also be backed up by sufficient documentation.

C.3.4.2 – Judging Format

The actual format of Design Evaluation may change from year to year as determined by the organizing body.

The 2024 Mini Baja Design Evaluation will be scored as the pair of Design Judges circulate among the teams and ask them a predetermined set of questions regarding the design of their vehicle. Two to four team members will present the Design elements to the judges. All team members who will give any part of the presentation or will respond to the judges' questions shall be at their designated table at the time the presentation starts and shall be introduced and identified to the judges. Design Evaluations will be in a question-and-answer format. Judges will ask the team a set of questions. Teams will be scored on how well they answer the judges' questions based on a rubric. The questions and rubric will be the same for all teams. The questions will not be provided in advance.

C.3.5 – Scoring

The engineering design event will be worth 150 points.

The judges may at their discretion award the highest placing team less than the maximum noted above.

Article 4 - Cost Evaluation

C.4.1 - Objective

The purpose of the Cost Event is to provide teams an opportunity to show the cost/benefit design decisions used in the prototype vehicle.

C.4.2 - Cost Report

The core of the Cost Report will be summarized in a digital format where teams can complete their overall Engineering Bill of Materials with material and manufacturing/purchasing costs followed by digital receipts as part of the Cost Documentation. In addition,

C.4.2.1 – Engineering Bill of Materials

The Engineering Bill of Materials includes the cost of ALL purchased parts as well as materials and manufacturing costs from AM processes. For example, if a team designs a part that they fabricate using a 3D printer, they will need to calculate the cost per gram of the filament that they used to create the part as well as how much material was used to create the part (including scaffolding). They do NOT need to stipulate the wear and tear and devaluation of the 3D printer.

C.4.2.2 – Cost Documentation

Cost Documentation is required for all purchased components, material costs, and manufacturing processes. For example, if a team orders filament for 3D printing their vehicle parts, a digital copy of the receipt for that filament should include the vendor, product name/description, and unit cost. Anything purchased to fabricate or assemble the Mini Baja vehicle should have an accompanying digital receipt presented at the Cost Evaluation. Teams are not required to list tools used to assemble or repair the vehicle as part of their Cost Documentation. Shipping costs are also NOT to be included in the Cost Documentation.

C.4.2.3 – Cost Reduction Report

One element of the Cost Documentation is evidence of how teams were able to save money through AM processes. Teams should be prepared to provide up to two (2) ideas for cost reduction. Each idea will be worth up to 5 points for a maximum total of 10 points.

C.4.2.4 – Cost Report Submission

Teams must submit a cost report at the cost report deadline. This report must be as complete as possible by this deadline, though a slightly updated copy will be accepted as part of the DRSD.

C.4.3 – On Site Evaluation

Two to four team members will present to meet with a cost judging team during the competition to ensure that the vehicle presented at the competition matches with the EBOM submitted in the Cost Report. All team members who will give any part of the presentation or will respond to the judges' questions shall be at their designated table at the time the presentation starts and shall be introduced and identified to the judges. Cost Evaluations will be in a question-and-answer format. Judges will ask the team a set of questions. Teams will be scored on how well they answer the judges' questions based on a rubric. The questions and rubric will be the same for all teams. The questions will not be provided in advance.

C.4.3.1 – Cost Audit

The judges may increase costs if they believe that the figures submitted are below current prices for the item, source, or process involved. All items found by the judges will be added to prototype cost at three (3) times the price of items found missing or below current prices. Prices that are higher than the judge expects will not be corrected. Mathematical errors will also be penalized. Reports that are highly inaccurate, highly incomplete, or in which the costs cannot be substantiated, may be rejected in their entirety and scored accordingly. Teams will present their cost report to the cost judges in their DRSD during the static judging listed on the schedule of events.

C.4.3.2 – Additional Team Review

The judges reserve the right to review with any team during the competition the accuracy of their EBOM relative to the vehicle brought to competition.

C.4.4 – Scoring

The Cost Evaluation event will be worth 50 total points.

C.4.4.1 – Cost Eligibility

Upon review of the data, the cost judge reserves the right to disqualify cost that has not been sufficiently validated (i.e. either through lack of documentation or outdated receipts), are determined to not be complete based on review, or are outside a reasonable level of cost based on the other cars in the competition (i.e. either too high or too low).

Article 5 – AM Evaluation

C.5.1 – Objective

The AM Evaluation event evaluates the team's ability to design and manufacture a prototype vehicle through effective use of Additive Manufacturing.

C.5.2 – Concept

The team's AM documentation shall relate specifically to the vehicle entered for the specific competition. Teams should assume that the judges represent different areas of industry including engineering, production, marketing, and finance. Teams should assume that not all judges may be engineers.

C.5.4 – Evaluation

The AM Evaluation will take place during the static judging listed on the schedule of events. Teams will be required to communicate specifics of their AM processes in the development of their Mini Baja vehicle to the AM evaluators.

C.5.5 – Format

Two to four team members will present the AM elements to the judges. All team members who will give any part of the presentation or will respond to the judges' questions shall be at their designated table at the time the presentation starts and shall be introduced and identified to the judges. AM Evaluations will be in a question-and-answer format. Judges will ask the team a set of questions. Teams will be scored on how well they answer the judges' questions based on a rubric. The questions and rubric will be the same for all teams. The questions will not be provided in advance.

C.5.6 - Equipment

Teams will be responsible for any equipment used to display their presentation materials for the judges. Teams should begin with a fully-charged laptop or tablet and have a backup laptop or tablet in the event that a power source is not available at the team tables. Teams will not be allowed to use any amplified audio equipment unless approved by the event coordinator.

C.5.7 - Evaluation Criteria

The AM Evaluation will be based on the following criteria:

AM Processes

Process Quality/Resolution

Fitment

Application

C.5.8 - Scoring

The AM event is worth 100 points. At the judge's discretion, the highest placing team may receive less than the maximum score noted above.

Part D: Dynamic Event

The dynamic event will be in the form of timed races. There will be two Qualifying Races and one Final Race. Each race will consist of 10 teams to complete as many laps as possible within 6 minutes. The first two races will be the Qualifying Races. The teams scheduled to compete in each qualifying race will be chosen at random. The top five vehicles from each qualifying race will advance to the final race.

If a team qualifies for the Final Race, but is unable to compete due to damage to their vehicle or technical issues, the 6th place vehicle from their Qualifying Race will take their place in the Final Race.

The points for the final race will be assigned below based on finishing order. Teams that do not qualify for the finals race will earn points based on their finishing place in the qualifying races.

Article 1 - Scoring Summary

Final Race				
Place	Points		Place	Points
1 st	100		6 th	60
2 nd	92		7 th	52
3 rd	84		8 th	44
4 th	76		9 th	36
5 th	68		10 th	28

Qualifying Races	
Place	Points
6 th	20
7 th	16
8 th	12
9 th	8
10 th	4

Article 2 - Practice

D.2.1 – Objective

Organizers may or may not provide a practice track to teams. A practice track allows teams to test or tune their vehicle within the limits of the rules.

D.2.2 – Course

If the organizer provides a practice track, the course length and features are at the organizer's discretion.

D.2.3 – Procedure

After a safety check, vehicles are signaled to enter the practice track. After a predetermined time set by the track worker, the vehicle is signaled to exit the practice track.

D.2.4 – Practice

Multiple vehicles may be on the practice track at any given time. It is up to the drivers to maintain a safe distance from each other during the practice laps to prevent damage to their vehicles.

D.2.5 – Penalties

Teams may be signaled to exit the practice track or barred from using the practice track if the track worker or competition officials observe unsafe conditions or behaviors.

D.2.6 – Scoring

There is no score awarded for practice.

Article 3 – Dynamics Course

D.3.1 – Mini Baja Course

The Mini Baja Course is a closed loop course with both left and right turns measuring approximately 18.3m (60ft) to 18.3m (60ft) and approximately 1.8m to 2.5m (6ft to 8ft) wide. The Mini Baja Course will feature different surfaces (e.g. carpet, concrete, gravel, shallow water, inclines, declines, jumps, drop-offs, and other terrain options). The Mini Baja Course will feature various obstacles and terrain to test the vehicle's durability, suspension, traction, and speed.

D.3.2 – Pit Lane

Pit Lane used for the Mini Baja course will be located directly in front of the drivers. Teams will be assigned a designated Pit Box with a team member stationed adjacently for repairs or adjustments. Pit Lane will be approximately 1m wide, including the sectioned Pit Box areas for teams. Teams that pit will must come to a complete stop for at least 10 seconds in an effort to prevent teams from using Pit Lane as a shortcut by avoiding obstacles.

D.3.3 – Pit Box

The Pit Box on Pit Lane will measure approximately 0.5m x 0.5m. Each Pit Box will be aligned sequentially with other teams. The assigned team mechanics will be seated directly between the drivers and the course.

Article 4 – Race

D.4.1 – Procedure

D.4.1.1 – Pre-Gridding

Teams will pre-grid before each Qualifying Race and be placed into starting position according to a random team selection process. Teams will pre-grid before the Final Race and be placed into starting position based on each team's performance in the Qualifying Races. Pre-gridding will close at a pre-determined time by SAE and the organizer. Teams late to pre-grid will be allowed to enter the track after the race has started from pit lane.

D.4.1.2 – Compliance Check

During pre-gridding, or after pre-gridding closes, a member of the events team will perform a compliance check. During compliance check and gridding, the driver and vehicle may only have one team member accompany them. The compliance check includes, but is not limited to inspection of the following:

- Transponder
- Battery pack(s)
- Inspection Markings

Unprepared drivers or out-of-compliance vehicles deemed unsafe or not ready to drive will be ordered out of the gridding line by race officials and sent to the paddocks to make corrections. Vehicles not ready to drive must check in at the scoring table to be admitted to the track at their pit box.

D.4.1.3 – Starting

The default start is to be from stationary grid positions marked on the course. If the course is not able to provide this option, the endurance event may be started by a standing staggered start, rolling start, or holeshot. A standing staggered start is used to release cars in groups of two with a delay in between groups. A rolling start allows a run-in distance to the start line. The rolling start may be performed on the course. A holeshot is a start where all vehicles are lined up equidistant to the first course feature and started all at once. The start type will be determined by SAE and 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.

D.4.1.4 – Running

The Mini Baja races will be run as either:

- A single 6-minute race
- A predetermined distance
- Elimination heats followed by a final in which the total time of one elimination heat plus the final is 12 minutes. The organizer will announce the structure of the event prior to the start.

Vehicles will safely navigate the course and accrue laps (orbits) to be counted and scored.

D.4.1.5 – Lap counter

The timing/lap counting system will be provided by SAE. The lap counter will be tested to verify that it is working on each car prior to each race. While it is unlikely that the lap counter will malfunction during a race, it is possible that not all laps will be counted with 100% accuracy. This will not be the fault of SAE. It is up to each team to monitor the lap counter during the race and verify that it is working for their vehicle. If it is found that laps are not being properly counted, it is up to the team to bring the vehicle into the pits and make adjustments so that the transponder can communicate with the lap counter. Laps will not be added to any team that fails to mount the transponder in a way to protect it and ensure that it can communicate with the lap counter. SAE staff and judges will not review video footage to overturn race results.

D.4.1.6 – Driver Change

Teams may decide to change drivers throughout the race or between the Qualifying Races and the Final Race. Vehicles must pull into their pit box, come to a complete stop before drivers may be changed. SAE reserves the right to require at least one driver change during the endurance event.

D.4.1.7 – Pit Lane / Pit Box

Teams whose vehicle requires service and repairs may exit the track and enter pit row at the designated entrance. Teams may only make repairs within their pit box or in an adjacent designated service area. No repairs are permitted on the course at any time.

D.4.1.7.1 – Service

Teams whose vehicle requires service and repairs and are unable to drive their vehicle to pit lane may exit the track at the designated location and proceed at walking speed to their pit box or adjacent designated service area. No repairs are permitted on the course at any time.

D.4.1.8 – Recovery

Vehicles disabled on the Mini Baja course may be recovered by track workers or race officials. Track workers will attempt to assist disabled vehicles by placing them upright on their wheels as quickly as it is safe to do so. It is the driver's responsibility to assist and cooperate with the track workers in removing the vehicle if necessary. If a vehicle becomes disabled, a track worker will transport the disabled vehicle to the side of the track where it can be recovered by a team member and taken to Pit Lane to attempt repairs. Track workers will operate on a "first come, first serve" basis. No priority will be given to any team over another.

D.4.1.9 – Finish

The Mini Baja event is finished when the lead car crosses the finish line after the time limit or distance has been reached. Vehicles remaining on the track will be allowed to finish their lap. Vehicles in pit lane will not be allowed back on the track after this time.

As vehicles cross the finish line, track workers will direct vehicles to their pit box or the impound area (if required). All post-event traffic shall be at low speed.

D.4.1.10 – Impound

SAE reserves the right to impound and inspect any vehicle during or after the endurance event. Mini Baja Technical Inspectors will direct and instruct teams in impound how to proceed.

D.4.2 – Penalties

Mini Baja Technical Inspectors are the only personnel permitted to call and assess penalties during the endurance event. Penalties during the endurance race will be signaled from and vehicles ordered off the track through the use of the PA system. Mini Baja Technical Inspectors may stop any vehicle, at any time, if they believe it no longer complies with the requirements and restrictions of the rules. All timed penalties are enforced from when the vehicle is fully stopped in their appropriate pit box (i.e. the time spent being transported back to the pits does not count towards the penalty).

Infraction	1st Offense	2nd Offense	3rd Offense
Failure to stop for a penalty when signaled	2 minutes	DQ	
Leaving the course and advancing	2 lap penalty	4 lap penalty	Discretionary
Aggressive driving	Warning	2 minutes	DQ
Speeding in pit lane	1 minute	2 minutes	DQ

D.4.2.1 – Aggressive Driving

Persistent aggressive driving will not be tolerated. Teams are to avoid collisions with other team's vehicles at all times. If a team is noticed to be driving aggressively, they will be given a warning, followed by a 2-minute penalty in their pits, followed by disqualification.

SAE realizes that most team members are not professional RC drivers. Accidents can and will happen. It is up to each team to design their Mini Baja vehicles to sustain a reasonable amount of accidental contact that is the result of the rigors of competition. We will do our best to mitigate aggressive driving by penalizing the offending team(s).

D.4.2.2 – Mechanical Faults

All cars must remain in the "as-approved condition" in order to compete; any condition that is deemed to not meet this requirement will be flagged to make necessary repairs or adjustments. If a vehicle is stopped by officials for a mechanical fault, the fault must be corrected before it may reenter the event.

D.4.2.3 – Vehicle Assists

Certain areas of the endurance course have been identified as difficult obstacles. If a vehicle is assisted two times on the same obstacle, the driver warned that one more assist will result in removal of the vehicle for the remainder of the event.

D.4.3 – Scoring

D.4.3.1 – Points

The maximum possible points for the race is 100 points.

D.4.3.2 - Determination of Winner

- a. The team that completes the greatest number of scored laps in the time set for the competition will be declared the winner.
- b. In competitions of a given distance, the leading car that finishes the set number of laps first will be declared the winner.

D.4.3.3 - Scored Laps

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

D.4.3.4 - Finish Order

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.

Article 5 - General Event Procedures and Regulations

D.5.1 – Safety

D.5.1.1 – Safety Vision

Safety is the primary consideration in the design of Mini Baja SAE® vehicles and the conduct of the competitions. No event or competition is so important that teams and organizers cannot take the time to work safely. All participants will strive to create a safe competition where all participants return home in the same condition in which they arrived.

D.5.1.2 – First Aid / CPR / AED

While medical services are always on-site at Baja SAE® events, teams are encouraged to be familiar with or trained in first aid, CPR, and the use of AED devices.

D.5.1.3 – Approaching Others

All participants are empowered to directly and respectfully approach others if they see a hazardous or unsafe condition and notify the person in danger. Persons approached regarding a safety concern are obligated to respectfully acknowledge the situation and are encouraged to thank those who approached them for their concern.

D.5.1.4 – Responsibility

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.

D.5.1.5 – Personal Protective Equipment

Teams are required to furnish and use their own PPE, appropriate for the task being performed. This includes, but is not limited to:

- Safety Glasses
- Gloves
- Closed Toe Shoes
- Hearing Protection

D.5.1.6 – Key Hazards

All participants are encouraged to pay careful attention to the following situations:

D.5.1.6.1 – Ascending and Descending

Maintain 3-point contact when ascending and descending stairs, ladders, steps, or risers. Watch for obstructions at the beginning and end of travel. It is possible that the event site will have a riser for drivers to stand on to better view the track while driving. It is possible that this riser will NOT have a railing, so constant vigilance is expected.

D.5.1.6.2 – Pinch Points

Stay clear of pinch points from rotating machinery, doors, and other equipment. Team members should follow safety procedures when using additive manufacturing equipment to avoid injury.

D.5.1.6.3 – Hazardous Release of Energy

Stay clear of sparks, chips, swarf, or other high-energy material. Check circuits for live wires before working on them. Depressurize high pressure air, oil, or water systems before working on them. Take care when working around high-speed rotary tools, soldering tools, or other hazardous equipment.

D.5.1.6.4 – Vehicle Operations

Vehicles are only to be driven on the course at the designated dynamic event times. Any vehicles driven within the other areas of the convention venue or hotel is strictly prohibited and grounds for disqualification. Teams may test their vehicles outside provided that they pose no hazard to others and are not destructive to any facilities.

D.5.1.6.5 – Walking / Path of Travel

Take care to keep all walking paths clear of slip, trip, and fall hazards.

D.5.2 – Rules of Conduct

D.5.2.1 – Sportsmanlike Conduct

All Mini Baja SAE® 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.

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 International staff.

D.5.2.1.1 - Prohibited Material

Alcoholic beverages, marijuana, firearms, weapons of any type, and illegal materials are prohibited at Mini Baja SAE® 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.

D.5.2.1.2 - Tobacco Products and Electronic Cigarettes

The use of all tobacco and marijuana products or using e-cigarettes on-site is prohibited.

D.5.2.1.3 - Footwear

All individuals on-site shall wear durable and sturdy footwear. Open-toed shoes are explicitly prohibited.

D.5.2.1.4 - Parties

Disruptive parties either on or off-site must be prevented by the faculty advisor or team captain.

D.5.2.1.5 - Housekeeping

Cleaning of trash and debris is the responsibility of the teams. Please make an effort to keep the paddock area clean and uncluttered. At the close of the day, each team must clean their work area.

D.5.2.1.6 - Site Condition

Please help the organizers keep the site clean. The sites used for Baja SAE® are generally private property and should be treated as such. Competitors are reminded that they are guests. 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 clean their areas after meals.

D.5.2.1.7 - Personal Transportation

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

D.5.2.2 - Spectator Rules

D.5.2.2.1 - 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.

D.5.2.2.2 - Alcoholic Beverages

Spectators may not drink or possess alcoholic beverages at any competition location.

D.5.2.2.3 - Access Restriction

Spectators must keep-back a specified distance from the event areas as decided by SAE International and the organizers and from any area where vehicles are operating under power. Motor vehicle competitions are potentially dangerous and safety rules will be strictly enforced.

D.5.2.2.4 - 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.

D.5.2.2.5 - Expulsion

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.

D.5.2.2.6 - Unsafe Conduct

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

D.5.3 - Paddock Rules

D.5.3.4 - 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.

D.5.3.5 - Team Vehicles

Only the Mini Baja SAE® vehicles themselves are allowed in the paddocks.

D.5.3.6 - Access Restriction

The organizers may limit the paddocks to team members, faculty advisors and competition officials.

D.5.3.7 - Compressed Gases

Teams are not allowed to bring gas cylinders. "Canned Air" used for cleaning computers can be used to clear debris from vehicles.

D.5.3.8 - Driving Restrictions

Mini Baja SAE® vehicles may only be driven on the course during official practice or in the events themselves and only after the vehicle has passed technical inspection.

D.5.3.8.1 - Off Site Operation

Driving off site is explicitly prohibited. Teams found to have driven their vehicle at an off-site location during the event may be disqualified from the competition.

D.5.4 - Meetings

All team members identified as captains or drivers and all faculty advisors **MUST** attend all meetings as designated; Attendance at meetings is mandatory. Failure to attend meetings can result in disqualification of members or the entire team.

D.5.5 - Tie Breakers

D.5.5.1 - Overall Event

Ties for the overall winner will be broken in the following order:

- 1) Final Race Score
- 2) Total Static Events Score
- 3) Qualifying Race Finish

If a tie remains after the prescribed tie breakers, the tie stands for the overall winners.

D.5.6 – Pre-Inspection Operation

Vehicles may not be started or driven prior to passing technical inspection, except as required as part of the inspection process itself.

D.5.7 – Inspection

Any vehicle may be impounded and inspected anytime during the competition. Any vehicle found to have altered or substituted its parts or equipment since passing technical inspection in violation of the rules may receive a point deduction of 100 points each time it is found in violation.

D.5.9 – Signals and Signage

Mini Baja SAE® competitions may use some or all of the signals and signage presented in this section.

D.5.9.1 – Flags

Mini Baja SAE® competitions will not be using flags for indicating course conditions or vehicle issues.

D.5.9.2 – Verbal Instructions and Warnings

Mini Baja SAE® competitions will primarily use the PA system to indicate course conditions or vehicle issues. If a PA system is not available, it is up to the teams to be aware of course workers and follow their instructions.

D.5.9.3 – Directional Arrow

Orange triangle with a 1.5:1 height to base ratio, with or without forked base. White or black trim is optional. The minimum base width is 1 inch. Directional Arrows similar to these will be used to indicate course direction on the perimeter of the track.

