Transportation Design Rules

Competition Description:

The Transportation Engineering Competition challenges student teams to evaluate an existing intersection and develop an engineering solution that improves traffic efficiency, safety, and accessibility.

Teams will act as transportation engineering consultants hired by a fictional city to redesign a problematic intersection. Each team must evaluate whether a roundabout, improved traffic signal, or alternative intersection design provides the most effective solution.

The competition emphasizes technical reasoning, creativity, cost-effectiveness, and the ability to communicate engineering recommendations.

Eligible Students:

1. Each participating university may enter one team.
2. Teams must consist of 3–4 undergraduate students.
3. All participants must be registered attendees of the ASCE Student Symposium.
4. Teams must complete their work independently. Assistance from faculty, professional engineers, or other teams is prohibited during the competition.
5. Each team must designate one member as its primary contact.

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Materials and Equipment

Provided by competition organizers:

- Existing intersection layout and site map
- Traffic volume and turning-movement data
- Pedestrian and bicycle activity information
- Relevant crash history
- Available right-of-way dimensions
- Construction budget and simplified cost estimates
- Design worksheets and calculation guidelines
- Paper, pencils, rulers, and other basic drawing materials

Permitted materials:

1. Non-programmable or standard scientific calculators
2. Rulers, protractors, and basic drawing supplies
3. Organizer-provided reference materials and worksheets

Prohibited materials:

1. Outside assistance from individuals not participating on the team
2. Previously completed designs prepared for the competition
3. Internet research, AI tools, and outside reference materials during the competition, unless expressly authorized
4. Specialized transportation modeling software unless supplied or approved by organizers

All teams must use the same approved resources.



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Design Requirements

Each team must submit an intersection redesign that addresses the following:

A. Traffic Efficiency

1. Identify current traffic problems, including congestion and delays.
2. Explain how the proposed design improves traffic flow.
3. Consider future traffic growth.

B. Safety

1. Identify existing safety concerns for drivers, pedestrians, and cyclists.
2. Include appropriate safety features, such as crosswalks and traffic signs.
3. Explain how the design improves overall safety.

C. Engineering Design

1. Provide a clearly labeled drawing of the proposed intersection.
2. Include lane configurations, traffic controls, and pedestrian crossings.
3. Ensure the design fits within the available space and meets the provided design requirements.

D. Budget and Feasibility

1. Keep the proposed design within the given budget.
2. Provide an estimated construction cost using the supplied information.
3. Explain why the design is realistic, practical, and cost-effective.



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Surprise Design Challenge

To evaluate adaptability and engineering judgment, organizers may introduce an additional design constraint during the competition.

1. The surprise challenge will be announced approximately halfway through the design period.
2. All teams will receive the same additional information simultaneously.
3. Teams must incorporate the new constraint into their final recommendation.
4. Teams must explain how the new information affected their design decisions.
5. The surprise challenge will account for 5% of the total competition score.

Possible challenges include an unexpected budget reduction, increased pedestrian traffic, changes in projected traffic volumes, or additional vehicle accommodation requirements.

Required Deliverables

Each team must submit the following before the designated deadline:

Deliverable 1: Intersection Design Drawing

A labeled plan-view drawing showing:

- Proposed intersection configuration
- Vehicle travel lanes and turning movements
- Pedestrian crossings
- Bicycle facilities, if applicable
- Traffic signals, signs, or other traffic control features
- Major dimensions and right-of-way boundaries

Deliverable 2: Engineering Analysis Worksheet

A completed worksheet containing:

- Identification of existing intersection problems
- Explanation of the proposed solution
- Basic traffic operations analysis
- Safety considerations
- Preliminary construction cost estimate
- Explanation of the response to the surprise challenge

Deliverable 3: Design Presentation

Each team must prepare a brief presentation explaining its recommended design and supporting engineering analysis.

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Presentation Rules

1. Each team will receive 7 minutes to present its design.
2. Judges will have 3 additional minutes to ask questions.
3. At least two team members must participate in the presentation.
4. Teams may reference their design drawings and completed worksheets.
5. Presentations will be evaluated on clarity, technical justification, and the ability to defend design decisions.
6. Teams exceeding the presentation time limit may be stopped by the judges.

Judging Criteria

Teams will be evaluated using the following 100-point rubric:
Safety and accessibility - 25
Traffic operations and efficiency - 25
Engineering design and technical accuracy - 20
Budget and feasibility - 15
Presentation and communication - 10
Surprise design challenge - 5
Total - 100
Additional judging considerations:

1. Judges will evaluate the engineering justification of each proposed solution rather than favoring any particular intersection type.
2. A roundabout will not automatically receive a higher score than a traffic signal.
3. Unsupported claims regarding traffic performance or safety may result in point deductions within the applicable scoring categories.
4. Designs exceeding the budget or violating major design constraints will receive deductions in the applicable categories.
5. Judges' decisions will be final.

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Competition Schedule

Rules and scenario briefing - 15 minutes
Initial analysis and design - 60 minutes
Surprise challenge announcement - 5 minutes
Design development and revisions - 45 minutes
Finalize drawings and worksheets - 20 minutes
Submit deliverables - 5 minutes
Total before presentations - 150 minutes

General Rules and Conduct

1. Teams must arrive and check in before the scheduled start time.
2. Teams must follow all instructions provided by competition officials.
3. Teams may ask organizers questions about the competition rules and provided data.
4. Any clarification affecting the competition will be shared with all participating teams.
5. Teams must submit their deliverables by the announced deadline.
6. Late submissions may be subject to penalties established and announced before the competition.
7. All work must be completed during the competition period.
8. Participants must demonstrate professionalism and respect toward judges, volunteers, and other teams.
9. Any disputes must be submitted to the competition coordinator before final scores are announced.
10. Competition organizers reserve the right to clarify rules before the event. Any substantive changes will be communicated to all teams.

