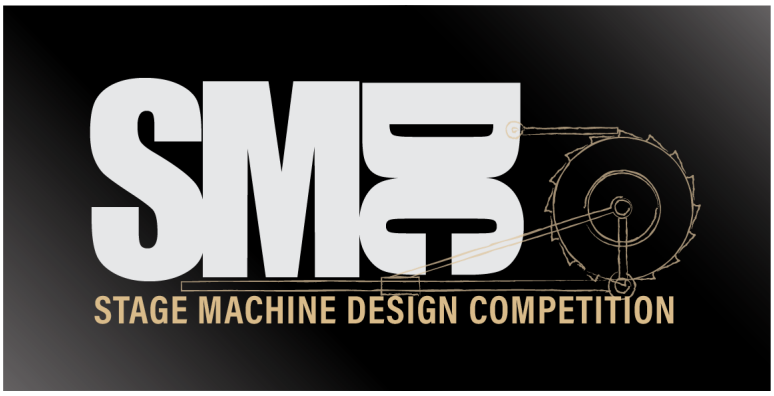

STAGE MACHINE DESIGN COMPETITION RULES

TEAM COMPOSITION

Teams of two to four, made up of any combination of college or university students at any level (graduate or undergraduate) may enter the competition. No solo entries will be accepted. No entries of teams with more than four participants will be accepted.

Each team must have a faculty or staff coach from a college or university theatre department who can attest to each team member's commitment to theatre technology and/or theatre engineering. Coaches must be present at the competition and can work with more than one team. (However, we recommend not coaching more than two total teams.)

REGISTRATION COSTS

Registration cost is $25 per individual participant (not per team) and is non-refundable. (Note that participants — including faculty sponsors — are responsible for all travel-related expenses, though lunch will be provided on the day of the competition event.)

TEAM EXPECTATIONS

All participants will be given the opportunity to design a solution to this year's Stage Machine Design Competition challenge. All teams will be given the same information about the challenge, including any constraints on the effect to be designed. Each team may choose the methods, materials, parts, and other elements of the solution (with some limitations; see below). Each team will be assessed by the judges using the same rubrics for each award category.

To enter the competition, each team must provide the following:

- **A written proposal** for their design with corresponding paperwork (*to be submitted three months prior to the competition event*):
    - Design specification documents (detailing the requirements of the machine, as best as the team understands them, etc.).

    - Concept designs (sketches, drawings, lo-fidelity prototypes exploring multiple design solutions to the challenge, and a justification for why the team chose to follow through on a specific concept).
- **A working prototype** (*to be tested on-site at the competition event*):
    - The prototype itself.
    - Any required tools to assemble and operate your device.
    - Any additional equipment beyond the scope provided in the event venue, within the parameters detailed in the Design Challenge.
- **A design document** (*to be delivered at the competition event*):
    - The proposal.
    - Detail design materials (estimates, parts lists, technical drawings, appropriate mathematical/engineering analyses, etc.).
    - As-built drawings.
    - Documentation of actual costs.
    - Any relevant safety and/or operation manuals.
    - Assessment of successes/failures of the design.
    - Assessment of successes/failures of the team.

Proposals should be submitted as PDF documents by the deadline indicated in the challenge document (approximately three months prior to the event date). A PDF of the final design document should be submitted prior to the competition event date. A bound copy (in a three-ring binder is acceptable) of the final design document should be delivered on the day of the competition event.

VENUE RESOURCES AVAILABLE

The following resources will be available at the competition site on the day of the competition:

- Up to 15A 110-120VAC power per participating team will be available for testing and competition.
- 100 PSI air pressure available by 1/4" tube or quick-connect by request. Requests for air supply must be made prior to May 1 by emailing the competition hosts.

Additional resources may be available depending on the specific challenge and will be detailed in the Design Challenge.

TESTING, CALIBRATION, AND DEMONSTRATION

On the day of the competition event, teams will be expected to display their prototype device for judges to examine prior to installation, testing, and evaluation. Judges will take this opportunity to ask questions of team members about the design and the design process.

Each team will be provided the same amount of time to install, test, calibrate, demonstrate, and remove their prototype devices from any testing apparatus required (and provided by the host venue). Teams can divide this time however is necessary, keeping in mind any expectations about timing that the challenge demands for the demonstration. The total amount of time available to each team will be specified in the challenge document.

For example, a challenge may indicate that a device must be in use for 10 minutes to satisfy the demands of the challenge, and that teams will have a total of 30 minutes for installation, testing, calibration, demonstration, and removal. Team A may complete their installation in five minutes, use 10 minutes for testing, 10 minutes to demonstrate their prototype, and five minutes to remove it. Team B may take 15 minutes to complete their installation, forego any testing/calibration, demonstrate their device for 10 minutes, and take five minutes to remove it.

EVALUATION AND RUBRICS

Judges will utilize evaluation rubrics (see below) to evaluate teams in each of the award categories (detailed below). The aggregate weighted scores for each individual award category will be utilized to determine the "Best Overall Design" award. In the rare case of a tie, judges will deliberate amongst themselves and make a determination based on their overall evaluation of each team's performance. At their discretion, judges may decide to present additional, special recognition awards, on the day of the competition.

RESTRICTIONS AND DISQUALIFICATION

Under no circumstances can any team's prototype include explosives or pyrotechnics. **Prototypes including explosives or pyrotechnics will be immediately disqualified from the competition.**

The competition hosts reserve the right to remove any device from the competition that is deemed unsafe to operate or in direct violation of competition guidelines. Additionally, all teams are expected to behave professionally, ethically, and within the honor code of their university or college. Teams may be disqualified for behavior unbecoming themselves or their schools. **All disqualifying or removal rulings are final, and no entry refunds will be issued.**

AWARD CATEGORIES

Best Overall Design

Judges will determine the best overall design based on the aggregate of each team's performance in each of the above categories.

Team members of the winner in this category will receive acrylic trophies for each team member and for their sponsoring school. Team member names will be included on a perpetual plaque

displayed in the competition venue commemorating their achievement. Each team member will also receive a full-conference pass to the next USITT Annual Conference and Stage Expo, and be provided an opportunity to present their design to conference attendees alongside "Best Overall Design" team winners from other competition locations.

Best Proposal

Members of the team with the best proposal submissions will receive certificates for each team member.

Best Proposal will be awarded based on the following:

- How well the proposal identifies the elements required for the effect.
- Whether the proposal demonstrates that the team considered more than one approach to addressing the challenge.
- How well the proposal describes the design concept that drives their prototype.
- How well the proposal justifies the chosen approach.
- How well the proposal justifies the cost/benefit ratio of the chosen approach.
- Whether the proposal identifies more than one way in which the design might be improved.

Written proposals will be judged on completeness, readability, and professionalism.

Most Efficient Installation

Team members from the team with the most efficient installation of their design will be awarded certificates for the Most Efficient Award.

Installation efficiency will be evaluated on the following:

- The installation process shows evidence of prior planning (ideally written planning).
- The installation process has a clearly identified leader and clear delegation/distribution of responsibilities.
- The team demonstrates obvious experience with tools and procedures; they demonstrate smooth transitions from one step to the next during the process.
- The team came prepared with all required tools and equipment.
- The team demonstrates mutual respect and communication; necessary questions are asked appropriately; demonstrates shared decision making when appropriate.
- The team completes the installation in the time allotted and allows time for testing/calibrating.

Most Elegant Implementation

Team members from the team with the design which the judges assess as being the most well-implemented will be awarded certificates for the Most Elegant Design Award.

Elegant implementation will be evaluated on the following:

- The device uses a reasonable number of parts/pieces/elements to achieve the desired operation.
- The device was created using good construction practices and uses appropriate fasteners/fastening techniques.
- The device utilizes appropriate materials based on requirements for size, strength, shape, etc.
- The materials and connections are well manufactured and machined; in look and function can be considered "well made."
- Attention was paid to the overall look and visual appeal of the device.

Most Effective Design

Team members from the team with the design which most accurately fulfills the expected requirements of the design challenge will be awarded certificates for the Most Effective Award.

In addition to the specific performance requirements defined by the design challenge, effectiveness will be evaluated on the following:

- Operation does not involve complex training, nor does it require exceptional exertion.
- Reloading/resetting does not involve complex training, nor does it require exceptional exertion, excessive equipment, or excessive breakdown/disassembly of device.
- Operation adheres to typical safe practices; it presents minimal danger to the operator, crew, and participants.

Best Teamwork

Team members from the team that demonstrates the highest level of collaboration, cooperation, and teamwork during the calibrating, installation, and testing of their device, and that the judges determine through conversations with participants worked the most collaboratively during the design and construction of their device, will be awarded certificates for the Best Teamwork Award.

Teamwork will be evaluated on the following:

- The team identified and/or demonstrated areas of shared responsibility during the design process.
- The team demonstrated shared responsibility, leadership, and respect during the installation process.
- The team shared credit for praise and responsibility for failure during the testing process.

Best Design Document

Members of the team with the best design document will receive certificates for each team member.

Best Design Document will be awarded based on the following:

- The document demonstrates engineering/mathematical analysis of the mechanical principles involved in the operation of the device.
- Technical drawings are well organized and follow accepted recommended graphic practices.
- Technical drawings provide clear instruction for construction of the device.
- The document includes a detailed parts list with cost and vendor information.
- The document provides clear instructions for safe use of the device and operational best practices (including for any reloading/resetting, etc.).
- The document includes a reflection on the device's successes and failures.
- The document includes a reflection on the team's successes and failures.

Stage Machine Design Competition

Judge: _____

Best Proposal

Scoring: 3 for exceeds expectations; 2 for meets expectations; 1 for does not meet expectations; 0 for no evidence/not completed

	Score
Clearly identifies elements required for the effect as detailed in the design challenge.	
Demonstrates that the team considered more than one approach to solving the challenge.	
Describes the design concept that drives their prototype and how the device works.	
Justifies the chosen approach as the best approach to the design challenge.	
Justifies the cost/benefit ratio of the approach.	
Identifies more than one way in which the design might be improved.	
Total	**0**

Stage Machine Design Competition

Judge: _____

Most Efficient Installation

Scoring: 3 for exceeds expectations; 2 for meets expectations; 1 for does not meet expectations; 0 for no evidence/not completed

	Score
Installation Planning Shows evidence of prior installation planning (ideally written).	
Leadership/Organization Clearly identitied leader; clear delegation of responsibilities.	
Prior Practice/Prototyping Obvious experience with tools/procedures; smooth transitions from one step to another.	
Equipment/Tooling Preparation Came prepared with all required tools and equipment.	
Mutual Respect/Collaboration Respectful communication; necessary questions asked appropriately; shared decision making when necessary.	
Use of Time Completes installation in time allotted; allows time for testing/double-checking.	
Total	**0**

Stage Machine Design Competition

Judge: _____

Most Elegant Implementation

Scoring: 3 for exceeds expectations; 2 for meets expectations; 1 for does not meet expectations; 0 for no evidence/not completed

	Score
Simplicity Device uses a reasonable number of parts/pieces/elements to achieve the desired operation.	
Construction Techniques Device follows good construction practices; uses appropriate fasteners/fastening techniques.	
Material Selection Device utilizes appropriate materials based on requirements for strength, size, shape, etc.	
Fit and Finish Matrials and connections are well manufactured and machined; in look and function can be considered "well made."	
Aesthetics Attention was paid to the overall look and visual appeal of the device.	
Total	**0**

Stage Machine Design Competition

Judge: _____

Most Effective Design

Scoring: 3 for exceeds expectations; 2 for meets expectations; 1 for does not meet expectations; 0 for no evidence/not completed

	Score
Ease of Operation Operation does not involve complex training; operation does not require exceptional exertion.	
Ease of Reloading/Resetting Reloading/resetting does not involve complex training; does not require exceptional exertion, excessive equipment, or excessive breakdown/disassembly of device.	
Reliability Devices operates as expected, minimal opportunity for failure from repetitive operation, reloading, or resetting.	
Performance	
Operation Safety Operation adheres to typical safe practices, presents minimal danger to operator, crew, and participants.	
Total	**0**

DEPENDENT ON SPECIFIC REQUIREMENTS INDICATED IN A GIVEN YEAR'S DESIGN CHALLENGE

Stage Machine Design Competition

Judge: _____

Best Teamwork

Scoring: 3 for exceeds expectations; 2 for meets expectations; 1 for does not meet expectations; 0 for no evidence/not completed

		Score
Design Team identified/demonstrated areas of shared responsibility during the design process.		
Installation Team demonstrated shared responsibility, leadership, and respect during the installation/load-in process.		
Testing Team shared credit for praise and responsibility for failure during the testing process.		
	Total	**0**

Stage Machine Design Competition

Judge: _____

Best Design Document

Scoring: 3 for exceeds expectations; 2 for meets expectations; 1 for does not meet expectations; 0 for no evidence/not completed

	Score
Engineering/Mechanical Analysis Demonstrates engineering/mathematical analysis of the mechanical principles involved in the operation of the device.	
Technical Drawings - Organization/Style Drawings are well organized and follow accepted graphic recommended practices.	
Technical Drawings - Clarity Drawings provide clear instruction for construction of the device.	
Costing/Parts List Includes a detailed parts list with cost and vendor information for construction of the device.	
Operation Instructions Provides instruction for safe use of the device and operational best practices (including reloading/resetting, etc.).	
Device Assessment Includes reflection on device's successes and failures.	
Self Assessment Includes reflection on team's successes and failures.	
Total	**0**