



**ASME Asia Pacific District
Humanitarian Shelter Student Design Competition**

Rules & Guidelines HSSDC 2007

Organized by
ASME Asia Pacific District

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Introduction

This contest from ASME (American Society of Mechanical Engineers) aims to address the need by the survivors immediately following a natural disaster, to provide for a shelter to shield the occupants from the weather: rain, snow, sun and wind, as well as excessive temperature fluctuations. The specific disaster considered here is a severe earthquake (of magnitude 7 on the Richter scale) that will have occurred in a mountainous terrain at an altitude of 3000 m above sea level. Temperature varies between -5°C at night to 15°C during the day. The area is subject to high winds of up to 80 km/h, rain and snow (up to 20mm of rain equivalent per day).

The participating teams will be required to design such a shelter for accommodating a family of four for up to four weeks. Teams will submit their design proposals and ten selected teams will be asked to build a prototype of their design. These prototypes will be evaluated by the judges and the winners will be presented with an award.

General Guidelines

Participating student teams must register by **20th October 2007** by using the registration form available at the HSSDC website. The submission of the design proposal is due **31st October 2007**. Teams can check the status of their registrations and submissions on the HSSDC Website.

Design proposals will be listed in the order of merit as determined by each one of the judges. Final ranking will be determined by the combined rankings from all the judges and any necessary discussions following from that.

The ten highest ranked design teams will be asked to provide a prototype shelter built according to their submitted proposal. The construction materials given in the allowable materials list are all assumed to be available from rubble, and thus have zero cost. Constructing the prototype, however, may necessitate purchasing the materials. The ASME Organizing Committee will reimburse each selected team for expenses in an amount not to exceed US\$1000 – if required.

The ten selected teams will be required to submit a short video detailing and showing the construction of their shelter. After viewing the videos of the prototypes the judges will select the three best designs (from the ten above) in terms of the Assessment Criteria.

The winning teams will be presented with an award of \$1,000 each and a certificate of merit, at an appropriate ASME District event. (Limited travel expenses for a representative from each of the three winning teams will be provided following ASME travel contribution rules).

Team Requirements

The competition is open to all undergraduate engineering students (ASME members and non-members) in the Asia-Pacific District. Non-members must be willing to join ASME if their design is among the ten selected in the first round. After graduation, their membership dues will be paid for one year by ASME.

The minimum number of members per team is two and maximum five.

All students must be full time undergraduate engineering students in an accredited university.

The contest is open to undergraduate engineering students of all disciplines, provided they obtain ASME membership if they are selected as the top 10.

Teams must be supervised by a faculty advisor, whose details must also be submitted while registering.

Design Brief

It is proposed to build an emergency shelter in an area affected by a natural disaster and immediately in the wake of the disaster. The shelter will be made from whatever materials (rubble) are available at the disaster site, and is meant to provide interim accommodation for up to four weeks until the more permanent dwellings can be provided by the rescue teams.

No provisions for cooking, washing and sewage disposal are to be addressed in this design. Electric power and water supply are not included in this design.

It is envisaged that the shelter can accommodate two adults and two children, and shield them from the direct exposure to ambient temperature fluctuations, winds and atmospheric precipitation. A total floor area of eight square meters is envisaged – including one square meter for storage, etc.

In addition, the shelter should, in its construction, provide for minimizing life-threatening hazards to its inhabitants if the disaster recurs within the designated four-week period.

The Specific Disaster Conditions are:

- Earthquake of magnitude 7 on the Richter scale
- Mountainous terrain at an altitude of 3000 m above sea level.
- Temperature variation between -5°C at night to 15°C during the day.
- The area is subject to high winds, up to 80 km/h.
- Rain and snow, up to 20mm of rain equivalent per day.

Judging and Assessment Criteria

The ASME Organizing Committee will assign Independent Judges. The Judges will review the design proposals and select the top ten teams for the final round based on the design proposals submitted. Design proposals will be listed in the order of merit as determined by each one of the judges. Final ranking will be determined by the combined rankings from all the judges and any necessary discussions following from that. The design proposal will only be used to qualify the teams to the final round; it will have no impact on the final scoring. Design proposals will be evaluated on the basis of the best design matching the required criteria.

The ten finalists will be assessed according to the following criteria based on the video of the complete prototype, sent by the teams. Decision of the judges will be final and participants cannot appeal against it. Judges may disqualify a team for not following the stated rules or teams that design a shelter that is outside the required criteria.

Assessment Criteria and Scores:

The judges will use the following Criteria to evaluate the 10 teams in the final round:

Scoring Factor	Max Points	Scoring Formula	Comment
Functionality and ergonomics of the space	100	Estimate by judge	The design must meet the specified criteria and be "user-friendly"
Tools Used for construction	200	See list of tools and their scoring factor	Tools should be low in number and with a high scoring factor to increase score
Erection time required	100	Estimate by judge	Simplest construction will be deemed to take shortest time to build
Weather protection	250	Estimate by judge	Effective protection against wind, rain and snow as well as thermal insulation to mitigate the effects of specified temperature range
Availability of materials	200	See the list of materials and their scoring factors	Use minimum and easily available materials to maximize score
No. of people required for construction	100	Up to four people may be working on the construction.	The lesser the number of people involved, the higher the score
Probability of surviving another event	100	Estimate by judge	Aftershock of smaller magnitude than the main event are expected
Construction Ease	200	Estimate by Judge	Skill(s) required to build the shelter. The lesser the skill involved the higher the score

List of Tools and Materials:

The following lists contain only a brief description of tools and materials that are allowed for the contest. For the complete detail and scoring, please refer to the Bill of Materials sheet available for download on the HSSDC Website.

MATERIALS
Wood
Brick
Stone
Soil / Earth
Concrete block
Metal
Plastic Sheet
Tarpaulin
Blanket
Cardboard
Wire
Nails
String
Rope
Rubber
Leaves/Grass
Galvanized Roofing
Dry Wall

TOOLS
Rock / Brick
Stick
Knife
Machete / Axe
Bar
Hammer
Spade / Shovel
Scissors
Rasp
File
Screw Driver
Mattock
Pliers
Saw
Chisel

1. Construction Materials

It is intended to encourage usage of common materials, expected to be found on the disaster site. Only the materials in the given table above are to be used. Using any material not specified above will disqualify the team from the contest.

2. Construction tools

The intention is to use the simplest tools expected to be available at the disaster site. Only tools on the above list of tools may be used. Using any tool not specified above will disqualify the team from the contest.

Scoring

For scoring, use the bill of materials sheet in Excel format. Teams only need to fill in the yellow spaces on the sheet; the scoring will automatically be calculated by the program. This sheet is available for download on the HSSDC website.

Teams can also use the judging sheet to evaluate their design; however teams must not submit this judging sheet with their proposals or videos. This sheet is also available for download on the HSSDC website. A sample sheet is also available for guidance on our website.

Report & Video

1. Design Proposal

This should be in a sketch format (CAD generated sketches are preferred, but sketches drawn by hand or using drafting tools are also acceptable) with descriptive notes explaining the design concept in adequate detail to judge its merits. The report should 'only' focus on the design and design details. It should be presented in a coherent manner and relate to the manner of construction, materials and tools used, special provisions for rainfall drainage and weather proofing. The team name and contact details must be clearly mentioned on the front page. The design proposal shouldn't be more than 20 A4 size pages. It should be either in MS Word format or PDF (preferable). It is suggested to use formatting that is clear and readable with normal spacing and a recommended font size of 12 pt.

Teams are also required to submit the **Bill of Materials** (BOM) Sheet in Excel format along with the design proposal. This proposal (complete in all respects) should be emailed to hssdc@asme.org by **31st October 2007**.

2. Video and Final Report

The ten selected finalists will be required to submit a short video clip (up to 10 minute long) showing the construction process of their shelter and pertinent details of the finished project. This video must be submitted on a CD / DVD playable by either the Windows Media Player or RealPlayer. The video should be clear enough to present

the design and display all details. The minimum resolution for the video is 640 X 480 pixels.

Teams must also submit, along with the video, the bill of materials and a brief report (up to 3 pages) with explanatory notes explaining how the design meets our required criteria, how many man hours and number of people were needed to construct the shelter, brief details of construction and expenditure on the project. This CD / DVD must be mailed to:

Charles Hurst
1321 Pinetree Drive
Frazier Park, CA, 93225
USA

If any of the teams has trouble sending the CD, they must immediately contact Charles Hurst or Usman Bin Younos for alternate methods.

Photographs

Teams can also send in photos of their design to be displayed on the website. Photographs are not a requirement, but this will give the teams a chance to display their talent to the rest of the world, photos can be emailed at hssdc@asme.org or included in the CD. Photos will be displayed after all entries have been received.

Contest Entry

Teams can register by downloading the form available at the HSSDC website: <http://districts.asme.org/hssdc>

The completed form must be emailed to hssdc@asme.org no later than **20th October 2007**.

The registered and confirmed teams will be listed on the HSSDC website.

The competition is only open to students within the Asia Pacific District**.

Funding

The 10 finalists need to complete the prototype of their design and present it for judging. Teams will be required to undertake the expenditures on their own and keep a record of their expenses. Teams must submit all details and records of the expenditures verified by the faculty advisor. ASME will then refund the teams the amounts that they spent (up to the US\$1000 per team limit.). It is preferable to submit the details of expenses along with the video. More information regarding funding will be communicated to the ten finalists at a later date.

***Asia Pacific District (or District G) includes all countries in the Asian Continent and Australia and New Zealand.*

Important Dates

20th October 2007: Registration Closes

31st October 2007: Design Proposal Submission Closes

19th November 2007: Announcement of results and the 10 finalists.

21st December 2007: Final Video Submission Closes

11th January 2008: Announcement of Winners.

Miscellaneous Notes

Team members may ask questions of the organizing committee about rules or rules interpretations if they are ASME members. All questions, together with the answers, will be posted on the contest web site for all teams to read. Posting of all questions and answers will occur once per week on the web site, probably on Tuesdays. ASME student members can use the following ASME COP (Community of Practice) site for asking questions: <http://cop.asme.org/COP/HumanitarianShelterStudentDesignCompetitionHSSDC>

All student teams are responsible for following and understanding the Questions and Answers posted on the contest web site, as these may modify or interpret rules as necessary in response to questions. For latest updates and news, keep visiting the HSSDC website at: <http://districts.asme.org/hssdc>

Rules clarifications or changes made in the Questions and Answers will supersede previously published rules. Any questions submitted after the 19th October 2007, will not be answered to avoid last-minute changes to rules which might inadvertently change the rules as understood by any team.

Non-members may join ASME immediately via www.asme.org

Decision of the judges will be final and participants cannot appeal against it.

Should any finalists pull out from the contest, their place will remain unfilled.

Teams cannot drop, add or change their team members once the registration form has been submitted.

Important Contacts

Contest Chair:

Vojislav Ilic

Phone: +61-2-4736 0386

E mail: ilicv@asme.org

Contest Vice Chair:

Charles Hurst

E mail: hssdc@asme.org

District G Chair for Student Matters:

Usman Bin Younos

Phone: +92-332-THE ASME

Email: usman@asme.org

Webmaster:

Judith Cobb

Email: hssdc@asme.org

Please do not contact the above personals for asking questions regarding the contest. You can post your questions via the COP. If you come across any problem, you may contact the appropriate person.