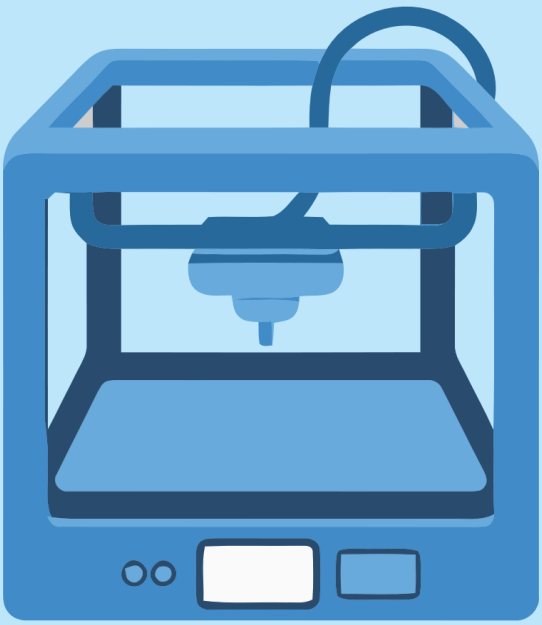
STEAM AZERBAIJAN

SAF 2025 INTERNATIONAL STEAM AZERBAIJAN FESTIVAL



NEXTGEN CREATORS

CATEGORY

SELECTION STAGE RULES

BAKI 2025

1. Introduction

Three-dimensional printing (3DP) is an emerging construction technology that operates based on the principle of creating a three-dimensional object by sequentially adding layers of material. This technology reduces labor costs, minimizes material waste, and optimizes construction time. While 3DP has long been used for prototyping and creating small-scale models in the construction environment, it is now being applied to the construction of houses and bridges.

The objective for participants is to design a structurally robust, rigid, and aesthetically appealing bridge. The bridge should require minimal assembly time while meeting predefined geometric requirements. Participants must focus not only on the design but also on the details of the printing process, as print quality plays a crucial role in the shape, accuracy, and load-bearing capacity of the bridge. Throughout the competition, participants are expected to demonstrate teamwork, organizational skills, analytical thinking, and creativity.

2.Participation Requirements

2.1. Each team must consist of one team leader aged 18 or older and two participants aged between 13 and 15. Each participant can only join one team and compete in a single category.

2.2. A team may apply to only one category. Applications from the same team or individuals to multiple categories of SAF-2025 will be considered invalid.

2.3. Participating teams are deemed to have accepted all terms specified in the regulations, as well as any modifications made by the SAF-2025 Scientific Committee.

2.4. Team names participating in the International STEAM Azerbaijan Festival must not contain or refer to political, religious, military, or conflict-related themes.

3.Important Notices for Participants

3.1. Participating teams must adhere to the spirit of fair competition. They must not engage in disputes, insults, physical altercations, provocations, or any actions that could harm other teams' projects. Additionally, they must not take any items without permission. Penalties for rule violations will be determined based on the severity of misconduct in the competition area.

3.2. Participants must be aware of safety regulations and must not engage in any behavior that threatens the safety of their own team or other participants. They must inform the responsible category officials before using any electrical power sources. The use of open flames and bringing hazardous items to the competition venue are strictly prohibited.

3.3. Team leaders and accompanying persons are not allowed to enter the competition field or interfere with the competition in any way. If a team leader or an accompanying person provides any form of assistance to their team or interferes with other teams' performances, the referee has the authority to issue a warning, disqualify the team, or impose other penalties.

3.4. Each participant is allowed to compete in only one category. Duplicate registrations, fraudulent registrations, misrepresentation of a participant's age, unauthorized substitutions, and similar violations are strictly prohibited. If such violations are detected and confirmed, the participant will be disqualified.

3.5. In the event of unforeseen circumstances not covered by the rules, decisions will be made by the coordinators.

4. Application Method

4.1. Applications will be accepted through the official SAF website: https://saf.steam.edu.az/en

5. Selection Phase

5.1. Bridge Dimensions

- The bridge must span an open gap of 480 mm.
- The total bridge length must be 520 mm.
- The overall height from the lowest to the highest surface must not exceed 130 mm.
- The bridge width must not exceed 130 mm.

Cross-section requirements:

- The clear span width must be 80 mm, and the clear span height must be greater than 60 mm.
- These dimensions must be maintained throughout the entire length of the bridge, ensuring that a test square of the given size can pass through without obstruction (See Appendix A – Figure 2).
- There must be a flat and continuous 3D-printed deck surface along the 80 mm open width.

- The bridge must consist of at least four separate parts but should form a smooth and uninterrupted surface when assembled. The use of adhesives (glue, tape, nails, etc.) is strictly prohibited in the assembly process.
- Except for the required clearance for the threaded rod passing through the load plate at the center top of the deck, no other openings or obstructions are permitted on the deck surface.
- The bridge's total weight will include the deck.
- The deck must cover at least the 480 mm open span (See Appendix A – Figure 1).

Loading Conditions

- The bridge will be subjected to a load.
- The load will be applied at the center of the bridge and in the middle of the open span.
- The load will be applied using a 6 mm diameter threaded rod.
- A minimum 13 mm diameter hole must be located at the center of both the bridge span and width to accommodate the 6 mm threaded rod (See Appendix A – Figure 3).

Bridge Components

- Mechanical Joint Requirement – Only mechanical connections are allowed.

5.2. Participants are required to create a 3D model of the bridge based on the given specifications.

5.3. Participants must submit a final report in **PDF** format, including the following sections:

- **Project Information** – Team and participant names, date, and project objectives.
- **Research & Preliminary Data** – Problems, solutions, research findings, and sketches.
- **Design Process** – Concept development, alternative designs, selected design, and specifications.
- **Calculations & Analysis** – Technical calculations, simulations, strength, and load analyses.
- **Challenges & Solutions** – Issues encountered, solutions applied, and modifications made.
- **Final Results & Improvements** – Final design, adjustments, conclusions, and future recommendations.
- **Appendices & Visuals** – CAD models, drawings, diagrams, tables, and .stl models.
- **Work Process** – Images taken during the project and task distribution among team members.

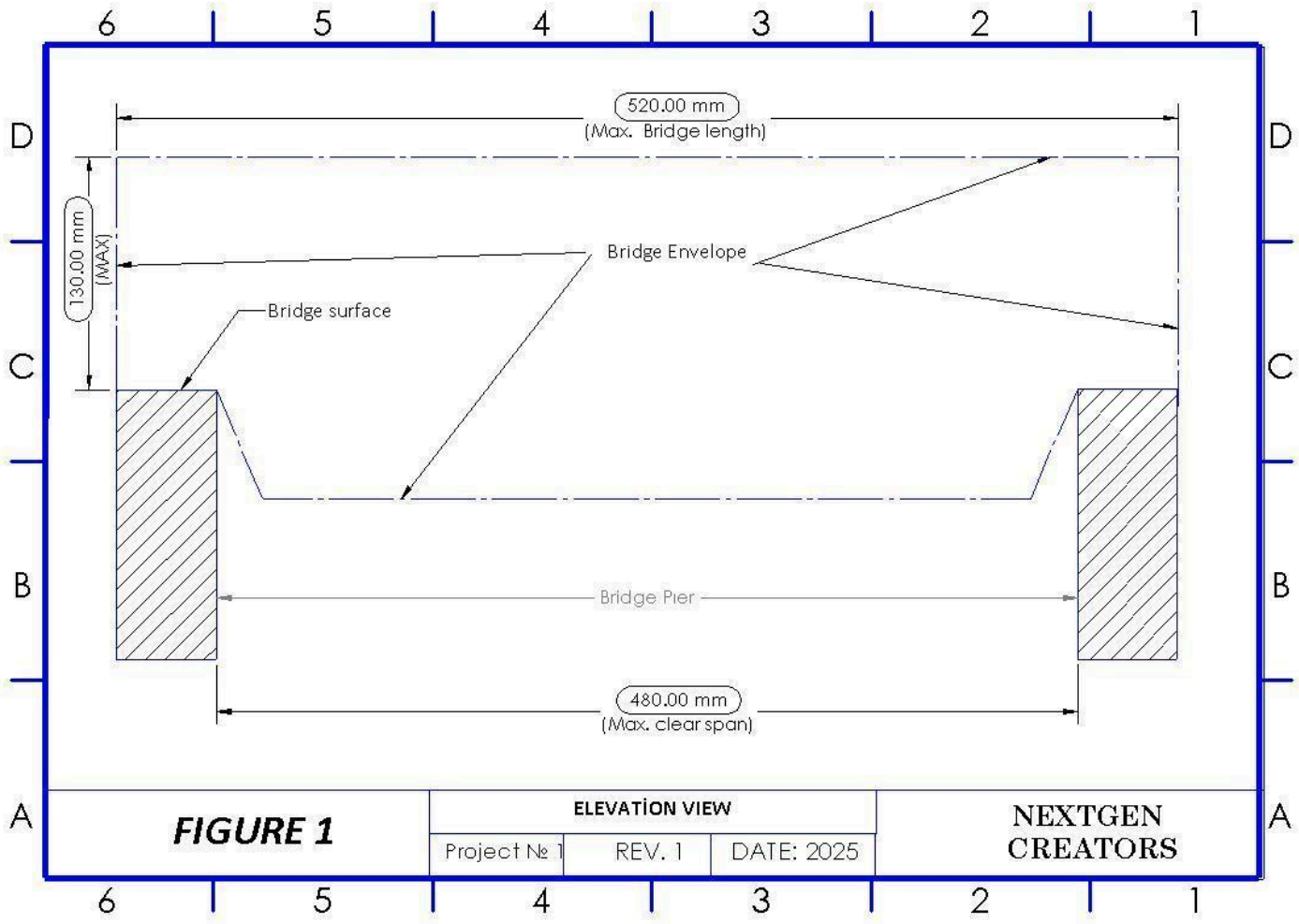
5.4. The created bridge models must be original.

5.5. Participants are required to upload their project-related files, including 3D models in **.stl** format and a report file prepared in **PDF** format, to their personal accounts on the official website.

6. Evaluation Criteria

6.1. Teams will be evaluated based on the following criteria:

No.	Criterion	Description	Points
1	**Design Logic and Structural Quality**	The stability of the bridge's construction, logical structure, and adherence to engineering design principles	30
2	**Proper Execution of the Task**	Full compliance with the given dimensions and technical requirements, successful completion of the load test, and overall functionality	40
3	**Creativity and Optimization**	The innovativeness of the design, and optimal use of materials and construction methods	10
4	**Teamwork Ability**	Level of collaboration among team members, planned and organized project execution, and effectiveness of task distribution	10
5	**Mechanical Assembly and Functionality**	Correct and stable mechanical joining of parts, and the creation of a smooth and continuous surface after assembly	10
		TOTAL SCORE	**100**


520.00 mm
(Max. Bridge length)
130.00 mm
(MAX)
Bridge Envelope
Bridge surface
Bridge Pier
480.00 mm
(Max. clear span)
FIGURE 1
ELEVATİON VIEW
Project № 1
REV. 1
DATE: 2025
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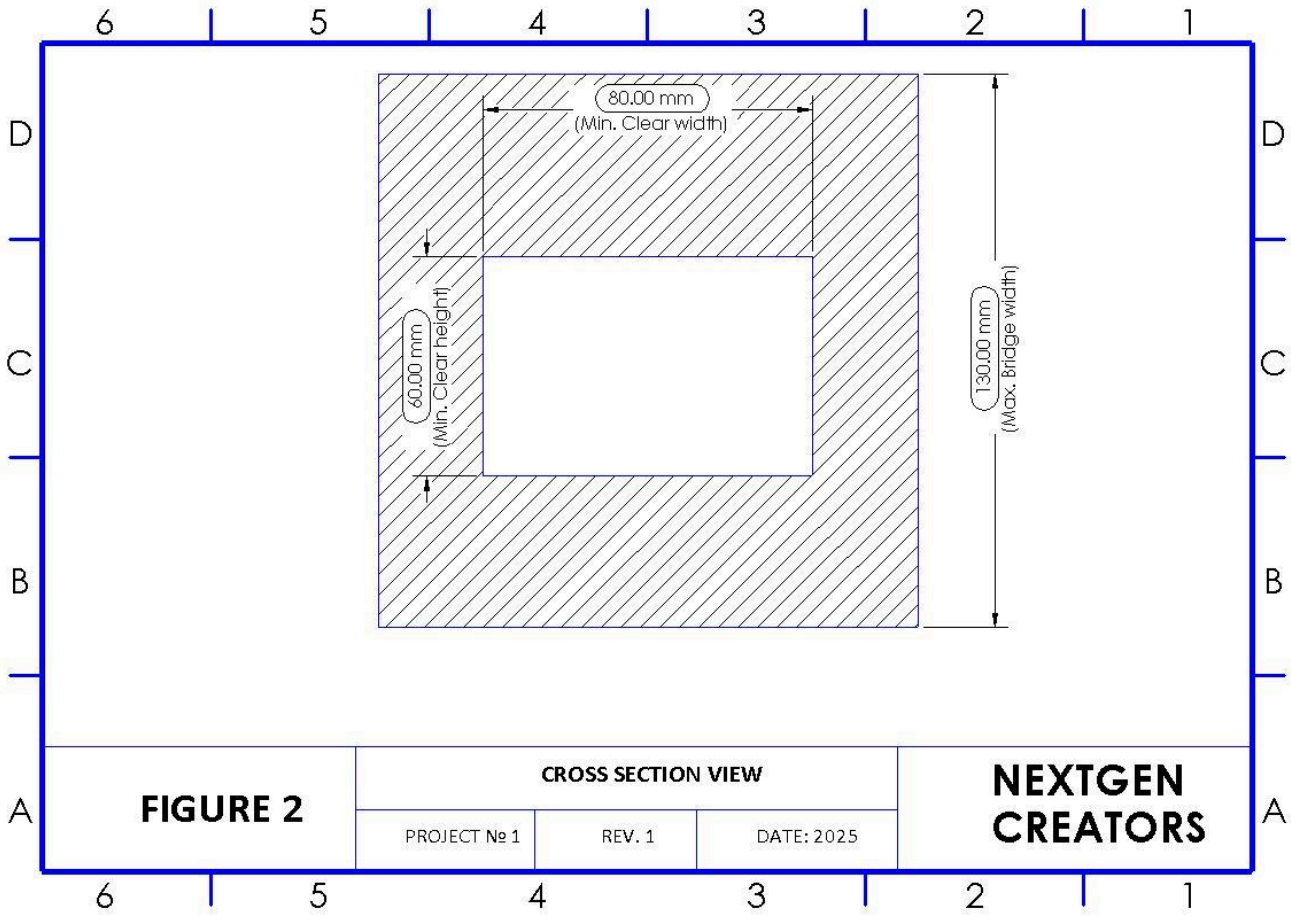
6
5
4
3
2
1
D
C
B
A
80.00 mm
(Min. Clear width)
60.00 mm
(Min. Clear height)
130.00 mm
(Max. Bridge width)
FIGURE 2
CROSS SECTION VIEW
PROJECT № 1
REV. 1
DATE: 2025
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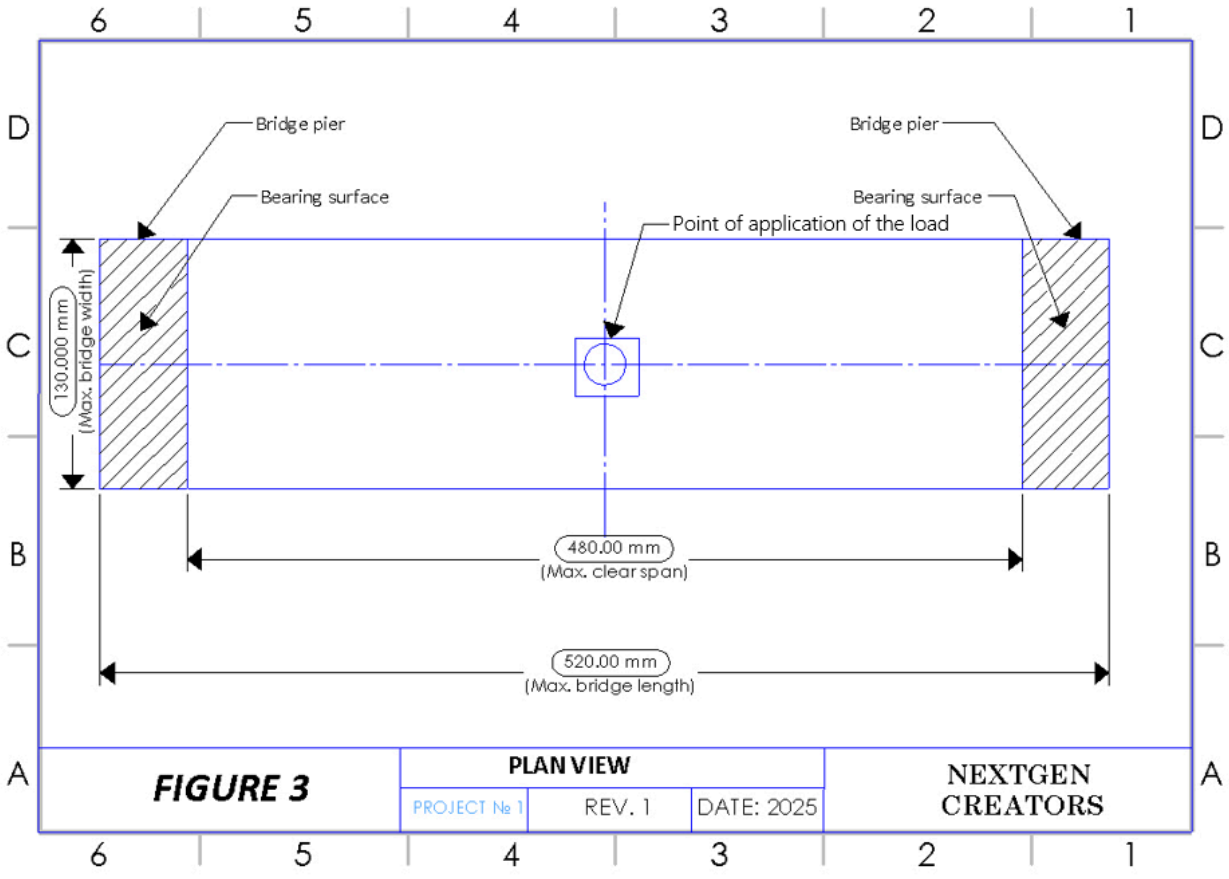
CREATORS


6
5
4
3
2
1
D
C
B
A
Bridge pier
Bearing surface
Bridge pier
Bearing surface
Point of application of the load
130.000 mm
(Max. bridge width)
480.00 mm
(Max. clear span)
520.00 mm
(Max. bridge length)
FIGURE 3
PLAN VIEW
PROJECT № 1
REV. 1
DATE: 2025
NEXTGEN
CREATORS