

# Structural Engineering Competition for the Youth 2026

## Building with Paper is So Easy! Dual-Arm Tower Challenge

### 青少年結構工程競賽 2026

### 「起紙」咁簡單！雙臂高塔大作戰

*Co-organized by*  
*Structural Division, The Hong Kong Institution of Engineers*  
*Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University*

*Supported by*  
*Education Bureau, The Government of the Hong Kong Special Administrative Region of the People's Republic of China*  
*Department of Civil Engineering, The University of Hong Kong*  
*Department of Architecture and Civil Engineering, City University of Hong Kong*  
*Department of Civil and Environmental Engineering, The Hong Kong University of Science and Technology*  
*Department of Construction and Quality Management, Hong Kong Metropolitan University*  
*Department of Construction, Environment and Engineering, Technological and Higher Education Institute of Hong Kong*

<b>Date:</b>	<b>13 April 2026 (Registration opens)</b>	<b>9:00 am</b>
	<b>13 June 2026 (Registration deadline)</b>	<b>5:00 pm</b>
	<b>20 June 2026 (Briefing)</b>	<b>9:30 am – 11:30 am</b>
	<b>4 July 2026 (Competition)</b>	<b>9:00 am – 5:00 pm</b>

**Venue: Z207, Block Z, The Hong Kong Polytechnic University (Briefing & Competition)**

#### Organizing Committee

Ir Prof Ray SU Kai-leung	HKIE Structural Division (Chairman) The University of Hong Kong
Ir Rayson WONG Wai-hung	HKIE Structural Division (Deputy Chairman) Housing Department
Ir Kylie LAM Nga-yan	HKIE Structural Division (Hon. Treasurer) Arup
Ir Prof Ben YOUNG	The Hong Kong Polytechnic University
Ir Prof LIU Siwei	The Hong Kong Polytechnic University
Ir Prof Paul LAM Heung-fai	City University of Hong Kong
Ir Dr Simon WONG Ho-fai	The Technological and Higher Education Institute of Hong Kong
Ir Jacky ZHONG Ying	China State Construction Engineering (Hong Kong) Limited
Ir Jesse CHAN Hiu-tung	Asia Infrastructure Solutions Limited

#### Target participants

Secondary school students (Form 4 to Form 5 students or equivalent levels only). Each team consists of four students. Each secondary school may form only one team for the competition.

#### Description of the competition

The main purpose of this competition is to raise secondary school students' understanding and interest in structural engineering through the design and construction of a paper tower subjected to gravity loads. Hopefully, this competition can provide students with valuable experience which can

facilitate the career planning of students and enrich their knowledge of engineering industry or the career paths of engineers.

The competition involves the design, fabrication and testing of a **dual-arm tower**. The model shall be assembled / fabricated with A4 paper and adhesive tape provided by the organizer.

## Regulations

The regulations consist of two parts: Model Requirements and Competition Rules.

### Model Requirements

1. The design of the tower must be innovative and aesthetic. It should be structurally stable and effective.
2. The tower must be constructed using the materials provided by the organizer.
3. There is no restriction on the structural form of the tower. Each team is free to adopt any structural system or configuration.
4. The total height of tower should be between 1.0 m and 1.5 m. As illustrated in Figure 1, the length and width of the base shall not exceed 50 cm (A 50 cm x 50 cm square will be shown on the baseboard). The length of each cantilever beam is between 20 cm and 50 cm (which is measured from the edge of the base to the loading point). Towers that do not meet these size requirements will be DISQUALIFIED. The headroom below the two cantilever beams must be at least 50 cm (which is measured from the lowest point of the cantilever arm to the base). The loading point of each cantilever beam must be designed by the students.
5. A loading test will be carried out by progressively adding weight to a hanger (to be provided by the organizer). The structure will be considered a failure if the hanger touches the ground within 10 seconds after adding weight.
6. The paper tower must be firmly fixed to the wooden baseboard using adhesive tape provided by the organizer.
7. Each team must prepare an A4-sized poster to present their design ideas. The poster may be prepared before the competition.

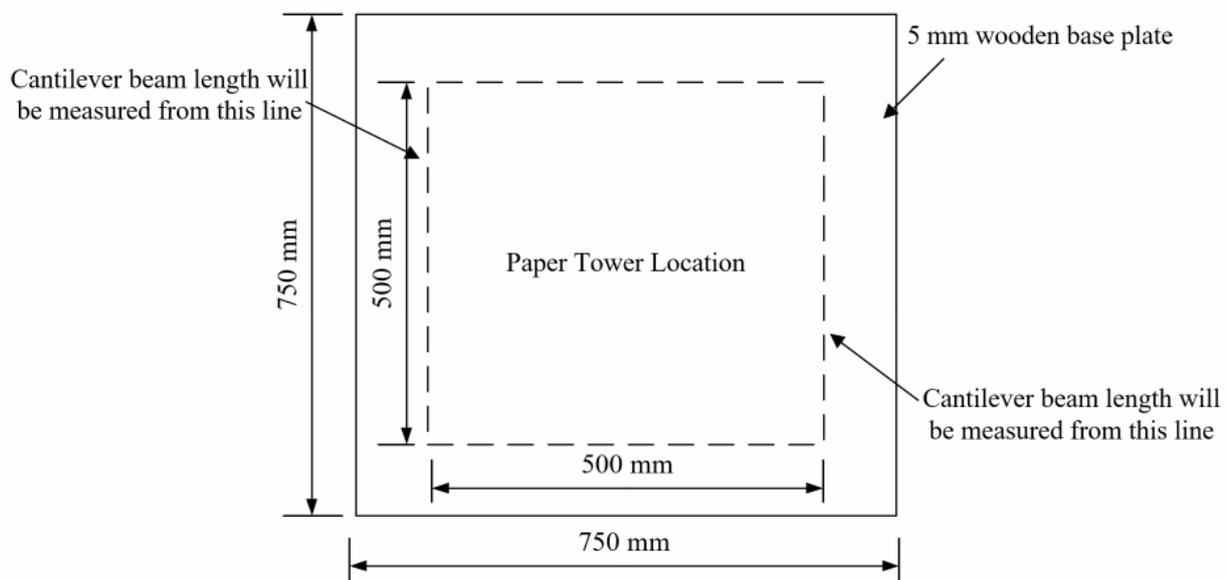


Figure 1: The base limit of paper tower

## **Rules**

1. If a team uses materials not provided by the organizer (or uses the provided tools as part of the model), the team will be disqualified.
2. Misconduct by any one of the team members will result in the disqualification of the entire team.
3. Team members must move the model from the fabrication location to the loading area.
4. If there is any damage caused to the model during the checking, transportation, and installation process, the team members will be held responsible.
5. Teachers are not allowed to enter the fabrication area or to communicate with students by electronic devices or other means during the competition.
6. Teams are not allowed to bring their trial models to the fabrication area.
7. Teams can bring their design drawings to the fabrication area.
8. Modification of the model after the dimension check is not allowed.
9. Teams are not allowed to damage the baseboard.

## **Materials for each team**

4 rolls of adhesive tape.  
250 pieces of A4 paper (75 – 80 gsm).

Upon completion of the modelling, each team must return ALL unused materials to a collection box. Each team may bring along scissors, cutters, rulers and pens.

## **Judging Criteria**

The competition is assessed by a judging panel to be assigned by the organizer. The Judging panel will comprise engineers and academic staff.

### **(1) Height**

The height of the paper tower is between 1.0 m and 1.5 m. It is measured from the top level of the cantilever beam to the base of the tower. The total height of the tower should not exceed 1.5 m.

The height of the paper tower will be measured and marks will be granted according to Table 1 and illustrated in Figure 2.

### **(2) Base length and width**

As illustrated in Figure 1, the base of the tower should not exceed the boundary defined by a 500 mm × 500 mm square. If the base of the tower lies outside this boundary, the team will be DISQUALIFIED.

The length and width of the tower above the ground level will not be limited (except the dimension criteria in cantilever beam).

### **(3) Dual cantilever beams**

The length of the cantilever beam is taken as the distance from the edge of the tower to the point where the load is hung, as shown in Figure 2. The length of each cantilever beam is between 20 cm and 50 cm. If the length of each cantilever beam is outside the range, it will be DISQUALIFIED. If the length of each cantilever beam is longer than 20 cm, marks will be awarded according to Table 1.

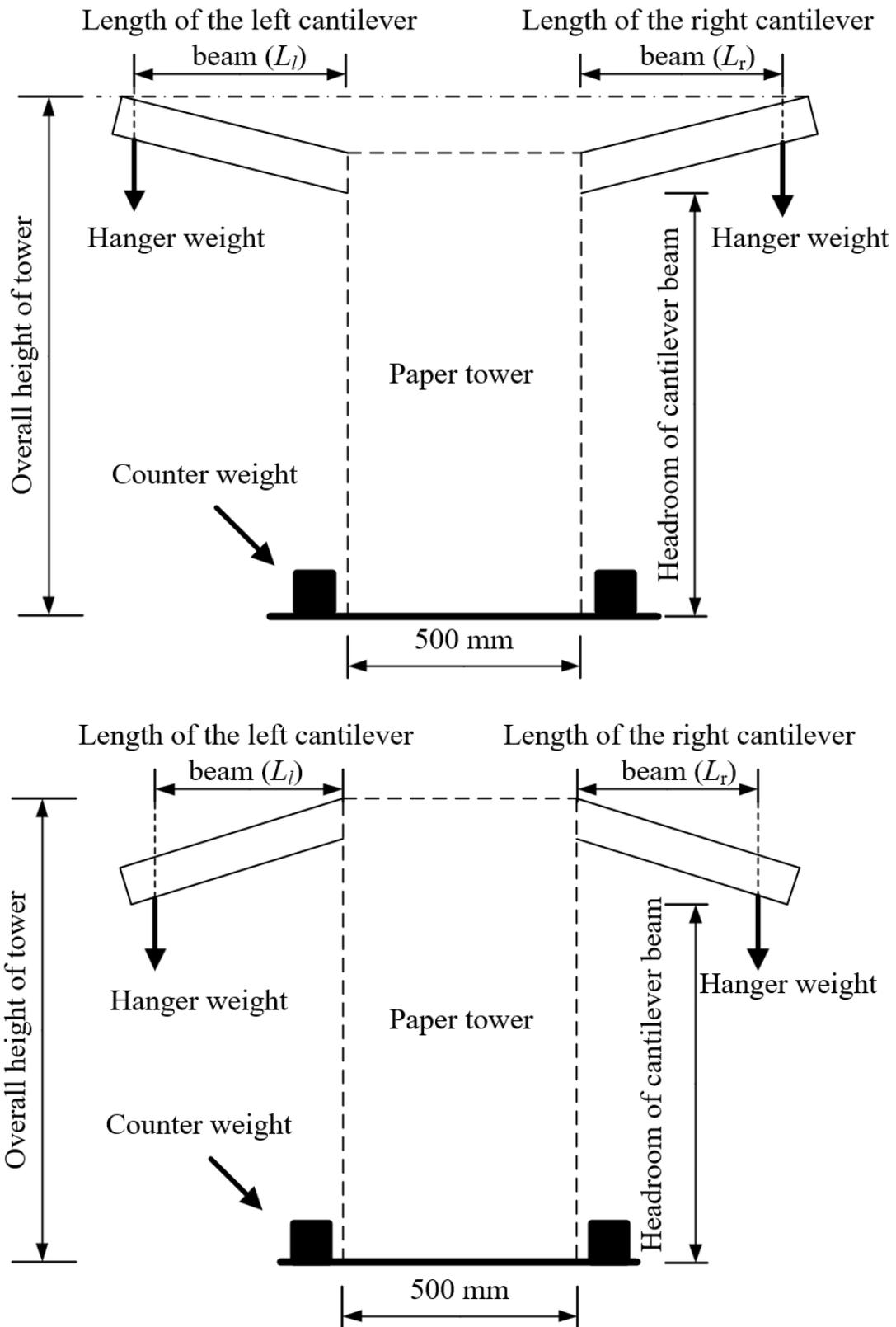


Figure 2: Measurement of overall height, headroom and cantilever beam length  
 (The headroom of the cantilever beam (which is measured from the lowest point of the cantilever beam to the base) as shown in Figure 2, must be at least 50 cm. If the headroom is more than 60 cm, points will be granted according to Table 1.)

#### **(4) Loading**

During the loading test, member(s) from the team will add weight to the hanger which is attached to the model. Each team may design and determine the loading point location on each cantilever arm based on their constructed structure; As illustrated in Figure 3, each team is given a 25 mm long hook-and-loop fastener (黏扣帶) for the students to connect their cantilever beam to the hanger for loading. In case the tower cannot suspend any load with the fastener, the team will be DISQUALIFIED.

During each loading attempt, loads must be applied simultaneously on both cantilever arms to ensure balanced structural behavior. Each team is allowed up to three loading attempts, regardless of success or failure. The applied load may be increased progressively, and the highest successfully completed loading level will be taken as the valid result. Scoring will be based on both the applied load and the distance from the loading point to the cantilever beam length measurement line shown in Figure 1, in accordance with Table 1. It is important to note that the maximum weight that can be added to the structure is 1000 g. If the hanger of the structure touches the ground within 10 seconds after weights are added, it will be classified as a "failure".



Figure 3: Fastener for hanger load

#### **(5) Lightness**

The assessment will involve weighing the model created by each team. The team with the lightest structure will receive 100 points for this part of the evaluation. Points will be awarded based on the criteria outlined in Table 1. Furthermore, the team that achieves the lightest model capable of supporting a minimum weight of 500 g will be awarded the "Commendation on Lightest" distinction.

#### **(6) Aesthetic and Innovative**

The tower will be assessed for aesthetic appeal and innovation. Each team should prepare a poster in A4 size to explain their design idea. The poster can be prepared before the competition and it must be self-standing. The judging panel will rank the towers based on the poster, the innovative structural form and the aesthetic overall outlook. The team with the highest rank will get 50 points from this part of the assessment. "Commendation on Aesthetic and Innovative" will be given to the team with the highest rank in aesthetic and innovation.

#### **Safety and Security**

During the competition, the organizer will take every possible precaution to ensure the safety of the participants and the spectators. However, participants and spectators shall be responsible for their own safety and personal property.

## **Adverse Weather Arrangements**

If a Pre-No. 8 typhoon warning signal (預告懸掛八號颱風訊號) or above remains hoisted at 7:00 a.m. on 4 July 2026, the competition will be postponed. The arrangements are also applicable when a black rainstorm warning signal is hoisted.

Please note that public announcements made by the Government's Education Department affecting primary and secondary schools, technical institutes and post-secondary colleges will also apply to the competition.

**Table 1 Scoring System**

Items	Criteria	Score
Height (from the top level of cantilever beam to the base of tower)	$\leq 1.0$ m	DISQUALIFIED
	1.0 – 1.1 m (1.1 m inclusive)	20
	1.1 – 1.2 m (1.2 m inclusive)	40
	1.2 – 1.3 m (1.3 m inclusive)	60
	1.3 – 1.4 m (1.4 m inclusive)	80
	1.4 – 1.5 m (1.5 m inclusive)	100
	$> 1.5$ m	DISQUALIFIED
Headroom of cantilever beam (from the lowest point of the cantilever beam to the base)	$\leq 50$ cm	DISQUALIFIED
	50 – 60 cm (60 cm inclusive)	0
	60 – 70 cm (70 cm inclusive)	20
	70 – 80 cm (80 cm inclusive)	40
	80 – 90 cm (90 cm inclusive)	60
	90 – 100 cm (100 cm inclusive)	80
	$> 100$ cm	100
Cantilever length (left arm)	$\leq 10$ cm	DISQUALIFIED
	10 – 20 cm (20 cm inclusive)	0
	20 – 30 cm (30 cm inclusive)	5
	30 – 40 cm (40 cm inclusive)	10
	40 – 50 cm (50 cm inclusive)	15
	$> 50$ cm	DISQUALIFIED
Cantilever length (right arm)	$\leq 10$ cm	DISQUALIFIED
	10 – 20 cm (20 cm inclusive)	0
	20 – 30 cm (30 cm inclusive)	5
	30 – 40 cm (40 cm inclusive)	10
	40 – 50 cm (50 cm inclusive)	15
	$> 50$ cm	DISQUALIFIED

Items	Criteria		Score	
Loading	In case the paper tower could not hang up any weight above the ground		DISQUALIFIED	
	(a) Base loading score	10 points per 125 g		
	(b) Cantilever length factor	$L_{avg} = \frac{L_l + L_r}{2}$	Average cantilever Length ( $L_{avg}$ )	Length factor $k$
			10 – 20 cm (20 cm inclusive)	1.00
			20 – 30 cm (30 cm inclusive)	1.10
			30 – 40 cm (40 cm inclusive)	1.25
		40 – 50 cm (50 cm inclusive)	1.40	
Final loading score		Base loading score $\times k$		
Lightness	the lightest tower		100	
	the 2nd lightest tower		90	
	...		...	
	the 10th lightest tower		10	
	the 11th lightest tower and afterwards		0	
Aesthetic and Innovation	the highest rank		50	
	the 2nd		40	
	...		...	
	the 5th		10	
	the 6th and afterwards		0	

**Important Dates:**

Registration opens: 13 April 2026 (Monday) 9:00 am

e-Registration Form	
<a href="https://forms.gle/V85UfutvZQGHUrwW7">https://forms.gle/V85UfutvZQGHUrwW7</a>	

Registration deadline: 13 June 2026 (Saturday) 5:00 pm  
 A total of 20 teams will be accepted, with registration granted on a first-come, first-served basis.

Briefing: 20 June 2026 (Saturday) 9:30 am – 11:30 am

Competition: 4 July 2026 (Saturday) 9:00 am – 5:00 pm

Venue: Z207, Block Z, The Hong Kong Polytechnic University  
 (Briefing & Competition)

### **Certificates**

An attendance certificate will be issued for each participant.

### **Prizes**

Prizes will be presented to the Champion (\$3,000), First Runner-up (\$2,000), Second Runner-up (\$1,000).  
 Commendation on Lightest (\$1,000).  
 Commendation on Aesthetic and Innovative (\$1,000).

### **Competition Schedule:**

<b>Time</b>	<b>Program</b>
8:30 am	<b>Registration</b>
9:00 am	<b>Opening address</b>
9:30 am	<b>Model fabrication</b>
12:30 pm	<b>1. Return the unused materials 2. Submissions of Model 3. Height and weight measurement</b>
1:00 pm	<b>Lunch (Judging panel assesses the structure models)</b>
2:30 pm	<b>Competition Loading tests</b>
4:30 pm	<b>Prize Presentation and Photos</b>
5:00 pm	<b>End</b>

### **Notes:**

1. The judging panel reserves the right to make the final decision and other interpretations.
2. For enquiry, please email to: [si-wei.liu@polyu.edu.hk](mailto:si-wei.liu@polyu.edu.hk).

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