



2026

BRICS SKILLS COMPETITION
(BRICS+ FUTURE SKILLS & TECH CHALLENGE)

Digital Construction Design

BRICS-FS-69

Technical Description
Offline/Online (International Final)

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BRICS Skills Competition (BRICS+ Future Skills Challenge)

1 Competition Overview

1.1 Basic Information

1.1.1 Competition Title

BRICS Skills Competition – Digital Construction Design (abbreviated as Good Housing Competition).

1.1.2 Competition Overview

The 2026 BRICS Skills Competition – Digital Construction Design is a team-based skills competition for two competitors, who work collaboratively to complete all competition tasks. The competition consists of two independent components: a theoretical examination and a practical assessment. The theoretical examination is conducted through the designated competition platform, while the DFC Digital Construction Platform serves as the core technical platform for the practical assessment.

The theoretical examination consists of single-choice questions, multiple-choice questions, and true-or-false questions. The examination mainly focuses on the core concepts and technical standards of the Good Housing initiative, together with the fundamental theories of Digital Construction. It evaluates competitors' understanding of the core principles of the Good Housing initiative promoted by the Ministry of Housing and Urban-Rural Development of China, relevant mandatory technical standards, as well as their knowledge and application of Digital Construction principles, technical systems, and full-process collaborative workflows.

The practical assessment covers AI-assisted design, cost-oriented design, m

multidisciplinary collaboration, and integrated modelling across architecture, structural engineering, steel structures, curtain wall engineering, landscape architecture, plumbing, HVAC, electrical engineering, interior decoration, quantity surveying, and other related disciplines. Competitors are required to complete modelling, design coordination, and project deliverables based on the DFC Digital Construction Platform. The assessment evaluates competitors' comprehensive capabilities in AI-assisted conceptual design, refined cost management, multidisciplinary collaboration, standardized project delivery, and end-to-end digital construction workflows.

The competition adopts a unified test project based on a real engineering project. Competitors are required to complete all assigned tasks using the project information and engineering data provided by the competition organizer. The competition aims to provide a platform for showcasing professional skills, exchanging technical experience, promoting mutual learning, and enhancing professional competence. It closely aligns with the development needs of the construction industry and the talent cultivation objectives of vocational and higher education institutions while strictly adhering to the principles of openness, fairness, impartiality, and transparency. Through the competition, the integration of industry standards, enterprise competency requirements, and educational talent development is promoted, thereby improving competitors' professional competence and practical engineering capabilities.

The competition is open to enterprise professionals as well as teachers and students from educational institutions. Competition categories include the Teacher Division, Undergraduate Division, Higher Vocational College Division, Second

dary Vocational School Division, and Enterprise Division. Each institution or enterprise may register a maximum of two teams. Eligible participants shall be between 16 and 35 years of age (born between 1 January 1991 and 1 January 2010). Eligible competitors include teachers and students from vocational colleges, technical institutes, universities, as well as employees of enterprises and public institutions. Enterprise participants may engage in positions such as construction engineering, engineering management, commercial management, cost engineering, and other related professions. Student participants shall be full-time students enrolled in civil engineering, architecture, construction engineering, construction management, building services engineering, architectural design, urban and rural planning, or other related disciplines during the 2026 academic year.

Through this competition, vocational colleges and universities are encouraged to continuously improve talent cultivation programmes, optimize curriculum systems, develop curriculum standards, reform practical teaching methods, and strengthen training facilities in line with the latest industry trends, advanced technical standards, and enterprise competency requirements. The competition further promotes the development of application-oriented professionals equipped with advanced Digital Construction knowledge and practical engineering capabilities to support the high-quality development of the modern construction industry.

(1) Registration Period and Registration Portal

The registration deadline is 24:00 (UTC+8) on 10 September 2026. Each participating institution or enterprise shall designate one representative to complete the registration process through the Competition Information Service Platform (<https://www.bricsacademy.org.cn/signup/index>). The representative shall access t

he registration portal for the 2026 BRICS Skills Competition (BRICS Future Skills and Technology Challenge), complete user registration, and submit the team registration information in accordance with the competition requirements before the registration deadline.

(2) Competitor Eligibility and Supporting Documents

For competitors from educational institutions, the required supporting documents shall be uploaded when completing the registration.

For student competitors, a copy of the student identification card shall be uploaded. The uploaded document shall combine into a single image the page containing the student's basic academic information, including the student's name, major, programme duration, and enrolment date, together with the page bearing the official registration stamp.

For teacher competitors, one of the following supporting documents shall be uploaded: a valid Teacher Qualification Certificate, a social insurance contribution certificate issued by the employing institution, or an officially stamped Certificate of Employment.

For enterprise competitors, one of the following supporting documents shall be uploaded: a social insurance contribution certificate issued by the employer or an officially stamped Certificate of Employment.

(3) Changes to Team Members

Once the registration of competitors and Expert Advisors has been confirmed, no changes shall be made without valid justification.

If a competitor or Expert Advisor is unable to participate due to exceptional circumstances during the preparation period, the participating institution shall

submit a written explanation to the Competition Organizing Committee no later than five working days before the commencement of the relevant competition. A replacement may be approved only after verification and confirmation by the Secretariat of the Competition Organizing Committee.

If a competitor is unable to participate for special reasons but fails to submit a replacement request to the Competition Organizing Committee and does not report to the competition venue as scheduled, the competitor shall be deemed to have voluntarily withdrawn from the competition, and the competition eligibility shall be forfeited.

Each participating institution is responsible for verifying the eligibility of its competitors and shall retain copies of all supporting documents for future inspection. The eligibility verification shall include, but is not limited to, identity cards, student identification cards, Teacher Qualification Certificates, and other relevant supporting documents. If any competitor is found to have submitted information inconsistent with his or her actual identity or eligibility, the competitor's competition results, awards, and related honours shall be revoked.

1.2 Competition Description

(1) The Digital Construction Design competition is developed in response to China's Digital China Strategy and the digital and intelligent transformation of the construction industry. It actively supports the national Good Housing Initiative and addresses the rapidly evolving trends of digital transformation and artificial intelligence in the Architecture, Engineering and Construction (AEC) industry. Centered on the DFC Digital Construction technology framework and bas

ed on real engineering projects, the competition establishes a comprehensive skills assessment system covering the entire project lifecycle, including conceptual design, multidisciplinary modelling, integrated collaboration, cost management, and project delivery. It aims to cultivate highly skilled digital construction professionals capable of meeting the future demands of the construction industry.

(2) The competition is guided by the principles of Safety, Comfort, Sustainability, and Intelligence, fully embracing the philosophy of the Good Housing Initiative. It encourages competitors to develop a whole-process digital construction mindset while promoting the transformation of project management from traditional outcome-oriented practices to full lifecycle digital management. The competition also advocates the core principles of the DFC Digital Construction methodology—Begin with the End in Mind, One Model Throughout the Entire Project, Data-Driven Decision Making, and Whole-Process Collaboration—demonstrating the practical value of digital construction technologies in delivering high-quality residential projects and supporting lifecycle project management.

(3) The competition fully integrates emerging technologies and methodologies, including artificial intelligence, digital construction, BIM-based collaboration, construction cost management, and digital project delivery. Particular emphasis is placed on AI-assisted design, end-to-end data integration, multidisciplinary collaborative design, and standardized project deliverables. Through the competition, participants are expected to master key digital construction technologies while enhancing their ability to manage complex engineering projects and collaborate effectively within multidisciplinary teams.

(4) Following the principle of "Promoting Teaching, Learning, Reform, a

and Development through Competition," the competition encourages vocational colleges and universities to integrate digital construction concepts, artificial intelligence applications, and whole-process collaborative project management into their talent development programmes. It further promotes the continuous improvement of talent cultivation plans, curriculum systems, curriculum standards, practical teaching methodologies, and training facilities, thereby establishing an industry-oriented digital construction education system and a future-ready talent development model.

(5) The competition adheres to the principles of industry-education integration and school-enterprise collaboration by incorporating advanced industry standards, real engineering projects, enterprise competency requirements, and digital production workflows into the competition framework. It promotes the deep integration of education, talent development, industrial development, and technological innovation, while supporting the digital and intelligent transformation of the construction industry. Ultimately, the competition aims to cultivate multidisciplinary digital construction professionals with an international perspective, innovative thinking, and strong engineering practice capabilities.

2 Skills Standards

This Technical Description defines the knowledge, understanding, and specific competencies required of professionals engaged in Digital Construction. The required competencies are aligned with international best practices in technical application and professional capability development, reflecting the shared understanding of occupational requirements for Digital Construction across BRICS countries.

ountries. These Skills Standards serve as the primary reference for competition training, preparation, and assessment.

The Skills Standards are organized into individual modules. Each module is assigned a percentage weighting of the total score to reflect its relative importance within the overall assessment framework. The combined weighting of all modules equals 100%. These weightings form the basis for the allocation of marks in the competition assessment system.

Competition assessment shall be based exclusively on the knowledge, skills, and competencies specified in these Skills Standards. Subject to the Competition Rules, the Competition Test Project shall be designed to provide the broadest possible coverage of all competencies defined in this standard. The Competition Skills Standards are presented in Table 1.

Assessment Category		Weighting (%)
1	Work Organization Structure and Project Setup (including Collaborative Environment)	5

	Participants are required to understand and be familiar with: • Application scenarios of Digital Construction (DFC) technology in various engineering projects • Composition of the Digital Construction standard system • Currently adopted and recognized standards, including: ○ Guidelines for “Good Housing” Construction (Trial) ○ Operational specifications of the DFC Digital Construction Platform • Applicable health and safety regulations • Technical terminology and symbols (e.g., lightweight modeling, material digitization, model-driven drawing generation, model federation, issue annotation, etc.) • Approved IT systems and professional design software are required to accurately and clearly communicate design intent • The importance of effective communication and interpersonal skills • The importance of continuous learning and skill upgrading in the context of rapid technological iteration • The role of innovative and creative solutions in addressing project implementation challenges • The impact of project collaboration settings on deliverables and deadlines • The importance of project briefings for clients and stakeholders	
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	Participants shall be able to: • Apply Guidelines for “Good Housing” Construction (Trial) and DFC Digital Construction Platform Operational Specifications • Access and identify standard components from system libraries and project libraries • Use and interpret technical terminology and symbols used for information modeling, structural, and architectural drawings • Utilize commonly used IT systems and professional design software to continuously produce high-quality digital models, drawings, quantity take-offs, and renderings • Coordinate and resolve issues (e.g., clash detection, issue assignment, and tracking) • Ensure compliance with project collaboration settings through effective communication with team members • Explain the role and objectives of Digital Construction to team members and other competition stakeholders • Communicate complex technical issues clearly to both expert and non-expert audiences • Provide creative solutions to design and construction challenges (e.g., lightweight optimization, structural avoidance strategies, and coordination adjustments) • Deliver a range of visualization outputs (models, drawings, renderings, animations) to support accurate project briefings	
Assessment Category		Weighting (%)
2	Modeling Software and Modeling Environment	5
	Participants are required to understand and be familiar with: • Computer operating systems • Peripheral devices used in digital construction workflows • Specific professional operations within design software • Workflow of digital construction projects • Limitations of design software File formats (e.g., SKP, DWG, etc.)	

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	Participants shall be able to: • Start hardware devices and activate modeling software • Configure and verify peripheral devices • Use operating systems and professional software to create, manage, and store files efficiently within local and common data environments for digital construction projects • Select appropriate graphical packages from on-screen menus or graphical interfaces • Launch and operate digital construction software through multiple methods • Configure software parameters (e.g., drawing output presets, fill presets, and collaboration settings)	
3	Insights into Design Schemes and "Good Housing" Construction Guidelines	10
	Participants are required to understand and be familiar with: • Information provided in the examination tasks (including requirements related to “Good Housing” such as safety, comfort, green development, and smart/intelligent features) • The importance of the design brief • The importance of requirement documents • Relevant and current industry standards (e.g., Guidelines for “Good Housing” Construction, DFC operational specifications, etc.) • How to work in accordance with Digital Construction (DFC) collaboration rules • How to create and edit digital construction information within a DFC cloud-based collaboration platform throughout the full construction lifecycle • The importance of project file structures and access/sharing permissions within the DFC collaboration platform	
	Participants shall be able to: • Interpret the design brief summary to determine project objectives and requirements (including “Good Housing” characteristics), client objectives, and project location.	

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Assessment Category		Weighting (%)
4	Digital Model Creation	50
	Participants are required to understand and be familiar with: • Software used in modeling and collaborative workflows • Relevant modeling software applications • Methods for classifying model elements by discipline (including model classification settings and model federation classification) • How to create models for different disciplines (architecture, structure, plumbing/drainage, HVAC, electrical, and interior decoration, etc.) • Principles of technical design • How to access and use project documentation within the collaboration platform • How to configure models as collaborative files • How to set project location, floor levels, and grid systems • How to create sub-model and federated model folder structures • The importance of information exchange at key project stages • How to create models according to standards • How to use lightweight browser-based models for 3D visualization and communication	
	Participants shall be able to: • Open an appropriate project information model from the relevant directory in the cloud collaboration platform • Complete project attributes using provided information (e.g., project name, floor count, elevation, building type, etc.) • Configure the model as a collaborative file (create model and publish/synchronize to cloud platform) • Set project location, orientation, and horizontal reference levels (grid systems and elevations) • Create architectural and structural grid systems (rectangular grids, radial grids, and grid editing) • Create models based on given CAD drawings (using feature-based or parametric modeling methods) • Save models according to specified views (scene management and scene updates)	

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	• Store all project information models in the DFC collaboration platform to enable cross-discipline access via the cloud • Comply with Digital Construction collaboration rules (project setup, permission assignment, approval workflows) to ensure secure data sharing • Use the DFC collaboration platform (desktop client, web-based platform, and mobile application) • Output standard drawings as required (plans, elevations, detail drawings in DWG format) • Create 3D visualizations to illustrate architectural characteristics of each building (including animation sequences and rendered images)	
Assessment Category		Weighting (%)
5	Model Coordination	10
	Participants are required to understand and be familiar with: • How to integrate models from different disciplines (creating a federated model, selecting master and sub-models) • How to perform clash detection (setting clash detection parameters, identifying and locating clash points) • How to upload and store clash detection reports as required • How to complete and document clash detection results (handling clashes through “resolve / ignore / delete” and recording their status)	
	Participants shall be able to: • Integrate or separate multi-disciplinary digital models using the federated model function • Execute clash detection in accordance with Digital Construction collaboration rules • Export all models according to collaboration requirements and store them in the cloud-based collaboration platform • Submit integrated models after completing cross-disciplinary coordination in compliance with collaboration rules • Identify issues in the integrated project model through model navigation (model walkthrough / roaming) • Configure clash detection parameters and perform clash	

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	ash analysis, and generate clash reports for identified issues • Add annotations to issues (including textual descriptions and screenshots via issue annotation tools) • Assign responsible persons for issues (using assignment functions within the issue/annotation system) • Name drawing and output files in accordance with collaboration naming conventions	
Assessment Category		Weighting (%)
6	Model Modification and Update	5
	Participants are required to understand and be familiar with: • How to modify models (adjusting components based on issue annotations or change requirements) • How to generate drawing outputs from models (model-driven drawing production, including plans, elevations, and detail drawings)	
	Participants shall be able to: • Update the project information model based on newly issued documents or feedback from issue annotations • Ensure that all project data complies with the latest standards, including material attributes and project definitions • Add classification information to models in accordance with Digital Construction collaboration rules (e.g., disciplinary classification, tagging definitions) • Export plans, detail drawings, and elevations from the updated model (using drawing presets and sheet management functions) • Generate complex structural detail drawings from the digital model (including the use of construction detail modeling tools)	
7	Data Extraction and Cost Management	5
	Participants are required to understand and be familiar with: • How to extract project data from digital models (Bill of Quantities and Bill of Materials) • How to create and register custom materials in the material library (Material Center → Create New → Define attributes) • How to define project information using custom data	

	a fields (e.g., material name, specification, model/type, fire resistance rating, etc.) • How to use database structures to express customized data requirements (e.g., filtering by material type)	
	Participants shall be able to: • Create materials with custom parameters for selected building elements (Product Factory → Create New → Extract from Model → Assign Attributes) • Create filters or tags to visually represent custom parameter information in complex plans, sections, and 3D cut views • Develop project information sets including custom parameters, and generate Bill of Quantities (BOQ) and Bill of Materials (BOM)	

Assessment Category		Weighting (%)
8	Model Visualization	5
	Participants are required to understand and be familiar with: - How to generate rendering images from digital models (AI rendering tools) - How to generate animation sequences from digital models (using marking, sectioning, and scene tools) - How to use composition, background settings, and other functions to provide more realistic model presentations for clients	
	Participants shall be able to: - Use appropriate software to create a complete and geometrically accurate project information model for presentation purposes, including renderings and animation videos - Apply composition techniques, lighting, and background settings to achieve optimal visual presentation effects - Add components such as people, furniture, and vegetation from asset libraries (material center)	
9	Model Deepening and Construction Application	5
	Participants are required to understand and be familiar with: - Preparation of construction methods and execution plans - File format conversion processes - Import and export of different file formats	
	Participants shall be able to: - Export files in multiple formats using digital construction software (drawings, quantity take-off lists, clash detection reports) - Simulate construction processes using digital construction tools (4D scheduling simulation linking components with time) - Produce visualization of complex construction methods and key construction techniques (e.g., 3D modeling of construction details and methods) - Perform project data backup (cloud storage and version control management)	

3 Competition Content

3.1 Competition Modules

Module		Duration (min)	Score (Weight)
Module 1	Theoretical Examination	60	100 (50%)
Module 2	Practical Assessment	120	100 (60%)
Total		180	200

3.2 Module Description

Module Number	Sub-module	Work Scope
Module 1	Healthy Housing Construction Guidelines	1. Core concepts including safety and durability, health and comfort, green and low-carbon development, and smart convenience 2. Definition and implementation pathways of “Good Housing”
	Digital Construction Technology	1. Concepts of DFC Digital Construction, “end-to-end design” and “single-source BIM model” principles 2. Differences between DFC and traditional BIM 3. Lightweight modeling rules, material digital definition, and model-driven drawing generation principles 4. Cloud collaboration workflow (project setup, collaborator invitation, permission assignment, model federation, and issue annotation)

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	Whole-Life-Cycle Building Management	1. Cost analysis and control (Bill of Quantities and Bill of Materials) 2. Lifecycle stages (planning, design, construction, operation & maintenance, demolition)
	Fundamentals of Drawing Interpretation	1. Reading of architectural, structural, and MEP CAD drawings 2. Identification of symbols, legends, and annotations
	Model Output	1. Merge model data and export backup files to designated folders
Module 2	Architectural and Structural Modeling	1. Create architectural and structural models based on CAD drawings (columns, beams, slabs, walls, stairs, doors, windows, and openings) 2. Apply feature-based or parametric modeling methods 3. Set up grid systems and elevation references 4. Apply lightweight modeling rules (componentization, polygon reduction, texture compression)
	Model Federation	1. Integrate multi-disciplinary models (e.g., architecture, structure, MEP) into a federated model file 2. Define master model and sub-model structure 3. Submit federated model updates and synchronize to cloud platform
	Issue Annotation and Collaboration	1. Create professional model issues (description and spatial location) 2. Assign responsible persons, set deadlines, and upload screenshots 3. Update issue status after resolution
	Material Digitalization and Cost Bill Generation	1. Project definition setup 2. Identify and validate undefined elements 3. Generate BOQ and BOM (material name, specification, quantity, unit) 4. Store components into material libraries (project library/user library)

	3D Conversion of Construction Methods and Details	Convert 2D CAD detail drawings into 3D construction detail models using the “Construction Detail” tool, including insulation, waterproofing, and node construction systems
	Drawing Layout and Sheet Composition	1. Configure drawing presets (sheet size, precision rules) 2. Create plan, elevation, and detail drawing views 3. Apply annotations (gridlines, dimensioning, elevation markers, material tags) 4. Complete drawing layout and alignment adjustments 5. Set hatch patterns (section and non-section fills) 6. Export drawings in CAD or PDF format
	AI Rendering and Visualization	1. Generate renderings using AI-based visualization tools (interior, exterior, and detail views) 2. Adjust materials, lighting, and environmental atmosphere 3. Export images at required resolution
	Model Output and Cloud Storage	1. Upload all deliverables (models, drawings, and BOQ/BOM files) to the cloud collaboration platform 2. Apply standardized naming conventions 3. Complete version control and management

4 Assessment Criteria

4.1 Judging Methodology

This competition adopts an integrated Judge–Expert Advisor assessment model. Each participating team shall nominate one Expert Advisor, who, upon completion of the required training, will participate in the assessment process. In addition, independent experts from non-participating educational institutions or e

enterprises shall be appointed to take overall responsibility for competition judging and event management, ensuring the fairness, impartiality, and consistency of the assessment process.

4.2 Organization and Responsibilities

(1) The organizational structure responsible for competition assessment consists of the Registration Team, Judging Panel, Supervisory Panel, and Arbitration Panel.

(2) The Registration Team is responsible for competitor registration, attendance verification, identity verification, and other pre-competition administrative procedures. These duties shall be undertaken by staff members of the host institution.

(3) The Judging Panel operates under the responsibility of the Chief Judge, supported by two Deputy Chief Judges, who are responsible for the overall management of judging activities and competition administration.

(4) According to operational requirements, judges are classified as Confidentiality Judges, Field Judges, and Assessment Judges.

Confidentiality Judges are responsible for organizing the drawing of lots, assigning competition workstation numbers, and encrypting and decrypting competitors' identities. Confidentiality Judges are appointed by the Regional Organizing Committee in accordance with the requirements of each competition. To ensure impartiality, Confidentiality Judges for the same competition shall be selected from different organizations and shall not participate in the assessment of competition results. Field Judges are responsible for maintaining competition disci

pline, recording on-site activities, monitoring compliance with operational procedures, and evaluating workplace safety and competition conduct throughout the event. Assessment Judges are responsible for assessing competitors' technical performance, compliance with operational standards, and submitted competition deliverables in accordance with the Assessment Criteria defined in this Technical Description.

(5) The Supervisory Panel is responsible for overseeing the entire judging process and conducting verification and random reviews of competition results to ensure the accuracy and integrity of the assessment.

(6) The Arbitration Panel is responsible for receiving written appeals submitted by Team Leaders regarding judging decisions, organizing the review process, and providing timely written responses to the appellant.

4.3 Assessment and Results Management

Competition results shall be managed in strict accordance with the procedures established by the Competition Organizing Committee. The assessment and management of competition results shall follow a standardized, transparent, and rigorous evaluation process.

The assessment consists of two components: Measurement and Judgement.

Measurement refers to assessment items that can be evaluated objectively using measurable data, while Judgement refers to assessment items that require professional evaluation based on predefined assessment criteria.

For Judgement-based assessment, a four-level performance scale shall be adopted to ensure fairness, consistency, and transparency. Detailed assessment be

enchmarks, supported by written descriptions, illustrations, physical samples, or other guidance materials where appropriate, shall be used for all assessment items. Performance shall be evaluated according to the following four levels:

Performance is below the industry standard.

Performance meets the industry standard.

Performance meets and exceeds the industry standard in specific aspects.

Performance significantly exceeds the industry standard and is considered outstanding.

Under the guidance of the Competition Expert Panel and the supervision of the Supervisory Panel, the Judging Panel shall be responsible for the assessment of competition results through both Process Assessment and Final Product Assessment. The assessment procedure is as follows.

(1) On-site Assessment

Field Judges shall assess competitors' operational procedures, workplace conduct, and on-site performance in accordance with the official assessment forms. The assessment records shall be confirmed by the competitors, the responsible judge, and the Chief Judge through signature.

(2) Final Product Assessment

Competition deliverables submitted by competitors shall be evaluated and scored in accordance with the Assessment Criteria specified for the competition.

(3) Identity Decryption

After the Chief Judge has officially submitted and verified the assessment results corresponding to each workstation number (competition project identification number), the Confidentiality Judges shall perform the identity decryption p

procedure under the supervision of the Supervisory Panel. This competition adopts a reverse decryption procedure. Upon completion of the decryption process and verification of competitors' identities, the Confidentiality Judges shall return competitors' identification documents, including their competition identification badges, to the respective competitors.

(4) Verification and Random Review

To ensure the accuracy and reliability of competition results, the Supervisory Panel shall conduct a full review of the assessment results for all competitors ranked within the top 30% of the overall competition results. For the remaining competitors, random verification shall be conducted with a sampling coverage of no less than 15%.

Any errors identified during the review process shall be reported promptly in writing to the Chief Judge, who shall correct the results and confirm the revisions by signature. If the error rate identified during the verification and random review exceeds 3%, the results shall be regarded as indicating a systematic assessment issue rather than an isolated occurrence, and the Judging Panel shall conduct a comprehensive review of all competition results.

The final competition results shall be officially announced by the Competition Organizer during the Closing Ceremony.

5 Skills Management and Communication

5.1 Expert Panel

Under the leadership of the Competition Expert Panel, the panel is responsible for providing overall guidance on the assessment and evaluation of competition results.

tition results.

5.2 Judging Panel

The Judging Panel operates under the responsibility of the Chief Judge, supported by two Deputy Chief Judges. Judges are categorized into Confidentiality Judges, Field Judges, and Assessment Judges according to their respective responsibilities. Confidentiality Judges are responsible for the encryption and decryption of competitors' identity information and do not participate in the assessment process. Field Judges are responsible for maintaining competition discipline, monitoring compliance with operational procedures, and conducting on-site assessments. Assessment Judges are responsible for evaluating competitors' competition deliverables in accordance with the Assessment Criteria specified in this Technical Description.

5.3 Arbitration Panel

The Arbitration Panel consists of one Arbitration Supervisor, who is responsible for receiving written appeals submitted by Team Leaders, organizing the review process, and communicating the final decisions to the appellant.

5.4 Supervisory Panel

The Supervisory Panel is responsible for overseeing the entire judging process and conducting verification and random reviews of competition results to ensure the fairness, accuracy, and integrity of the assessment.

5.5 Registration Team

The Registration Team is responsible for competitor registration, attendance verification, identity verification, and other related administrative procedures. These duties shall be undertaken by staff members of the host institution.

5.6 Official Communication

All competitors and related personnel shall handle any disputes arising during the competition strictly in accordance with the procedures specified in the Competition Rules. The dissemination of false information, misleading statements, or inappropriate comments through competition-related WeChat groups, QQ groups, or any other communication platforms is strictly prohibited.

6 Competition Materials and Equipment

6.1 Competition Infrastructure List

Competition-Designated Software				
Number	Name	Version	Provider	
1	“Good Housing” Digital Construction Design Competition Platform	V2.0	Tiangong Kaiwu (Shenzhen) Technology Co., Ltd.	
2	DFC Education Edition	V6.0		
Competitor Workstation				
Workstation Equipment / Consumables / Office Supplies				
Number	Name	Technical Specification / Reference Link	Unit	Quantity
1	Computer Desk	140 × 70 × 75 cm	unit	XXX

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	(dual-user desk)			
2	Chair	54 × 42 × 77 cm	unit	XXX
3	Computer (including mouse, keyboard, monitor)	CPU ≥ Intel i7-13700, RAM ≥ 16GB, Storage ≥ 256GB SSD, GPU ≥ NVIDIA GeForce RTX 2070; USB ports ≥ 4; dual-display support per workstation; Gigabit network card	set	XXX
4	16 mm ² 3-core power cable	For workstation power distribution	meter	400
5	4 mm ² 3-core power cable	For workstation power distribution	meter	800
6	Power distribution box	Including residual current device (RCD), circuit breakers, and mounting rail	unit	1
7	Power strip	Dual-row, 6 outlets; distributed for 60 workstations	unit	100
8	Network cable	Category 6 (Cat6) unshielded twisted pair cable	box	10
9	Electronic display screen	Used for promotional videos and competition timing display	unit	6
10	Warning tape	Yellow-black PVC warning tape, 10 cm width, 33 m per roll	roll	30
11	Black signature pen	—	piece	200
12	A4 file folder (hardboard)	—	piece	200
13	A4 document storage cabinet	—	unit	1
14	Disinfectant wet wipes	—	box	60
15	Water dispenser (for judges and staff use)	—	unit	4
16	Bottled drinking water (for judges and staff use)	—	barrel	15
17	Disposable paper cups (for judges and staff use)	—	piece	500
18	Draw box	Used for workstation number lottery	unit	6
20	First-aid kit	—	unit	5
Number	Workstation Requirements			
1	Minimum workstation area: 12 m ² (4 m × 3 m)			
2	Power supply per workstation: 220V			

3	Power socket requirement: 3-pin, 6-outlet power strip (total: 100 units)	
4	Each workstation shall be provided with one network port (total: 200 ports)	
Other Venue Requirements (Common Area)		
Number	Requirements	
1	Minimum total venue area: 20 m ²	
2	Multimedia projector	
3	Projection screen	
4	Network connectivity: 100 Mbit/s	
5	LED digital clock display	100 mm × 60 mm
6	KT board for competition area signage	A3 landscape format
7	Banner	subject to organizing committee requirements
8	Roll-up stands	including competition introduction, company profile, and equipment introduction; subject to organizing committee requirements)

6.2 Competition Venue Layout

The layout of the competition area and workstation arrangement is illustrated in Figure 1.

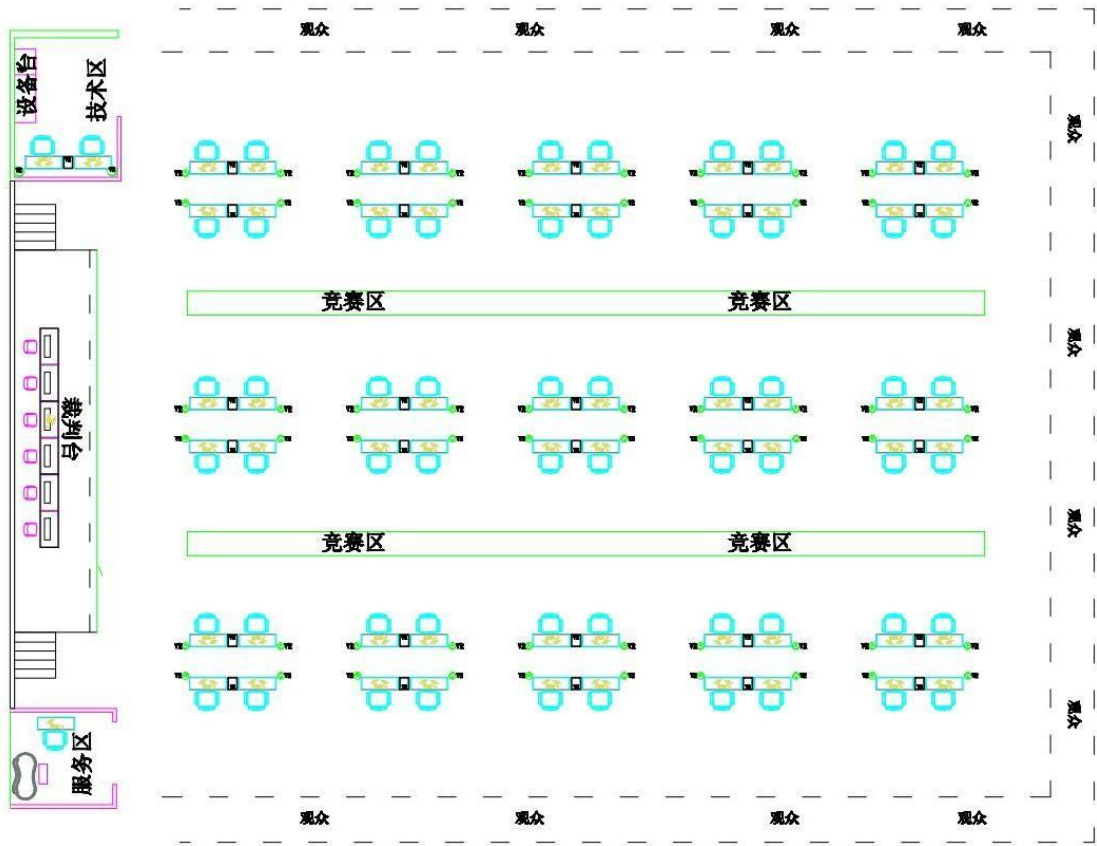


Fig 1. Competition Area and Workstation Layout

7 Competition Test Project

7.1 Test Project Development

The competition consists of two independent modules: the Theory Examination (Module 1) and the Practical Assessment (Module 2). Together, these two modules constitute the complete Competition Test Project, assessing competitors' theoretical knowledge and practical competencies in the field of Digital Construction.

The Theory Examination (Module 1) primarily assesses competitors' understanding of: the core principles and key requirements of the Good Housing Initiative; the fundamental concepts of DFC Digital Construction, including its differences from traditional BIM methodologies and its core advantages; the fundamentals of building lifecycle management, including project phase management and cost analysis; the fundamentals of engineering drawing interpretation for architectural, structural, and MEP disciplines.

The Practical Assessment (Module 2) primarily evaluates competitors' competencies in: architectural and structural modelling, model integration, model annotation, and multidisciplinary collaboration; material library management, generation of cost schedules, three-dimensional conversion of construction details, and construction methodology modelling; drawing layout, drawing-to-model conversion, AI-assisted rendering, and the delivery of digital models and engineering drawings.

The official Competition Test Project will be developed by combining assessment tasks within the competency scope defined above. Each module assesses different combinations of competencies while collectively covering all knowledge, skills, and competencies specified in the Competition Skills Standards presented in Table 1.

To ensure fairness and confidentiality, the detailed tasks of the official Competition Test Project will not be disclosed prior to the competition. Only the competency scope and key technical requirements will be published in advance.

7.2 Sample Test Project

The Sample Test Project will be published on the official competition website to demonstrate the task types, assessment scope, and submission requirements. The official Competition Test Project will be based on the Sample Test Project, with approximately 30% of the content modified. Modifications may include, but are not limited to, task parameters, model content, component types, material specifications, project information, and required deliverables. The number of tasks and the overall workload for each module may be adjusted according to the competition duration and assessment requirements, while the assessed knowledge and competency requirements will remain unchanged.

8 Appeals and Arbitration

A two-level arbitration mechanism shall be adopted for the competition. The Regional Arbitration Committee shall be established at the competition region level, while an Arbitration Panel shall be established for each competition. The Arbitration Panel shall perform its duties independently under the leadership of the Competition Executive Committee.

(1) If a participating team considers that the competition equipment, computer hardware or software, competition tools, supplies, judging procedures, venue management, or the conduct of competition staff fails to comply with the provisions of this Technical Description or the Competition Rules, the Team Leader may submit an appeal to the Arbitration Panel on behalf of the

participating team.

(2) To initiate an appeal, the Team Leader shall submit a written appeal, signed personally, to the Arbitration Panel. The appeal shall provide a clear and factual description of the incident, including the circumstances, time of occurrence, persons involved, and the basis for the appeal. Appeals submitted in any form other than a written document shall not be accepted.

(3) An appeal shall be submitted within two (2) hours after the completion of all competition tasks by the competitors. Appeals submitted after the prescribed time limit shall not be accepted.

(4) Upon receipt of a written appeal, the Arbitration Panel shall organize a review within two (2) hours and communicate the decision to the appellant in writing without undue delay. If the appellant remains dissatisfied with the decision, the Team Leader may submit a further appeal to the Regional Arbitration Committee. The decision of the Regional Arbitration Committee shall be final and binding.

(5) The arbitration decision shall be acknowledged and signed for by the appellant in person and shall not be collected by any other individual. If the appellant fails to appear at the agreed time and location to receive the decision, the appeal shall be deemed to have been voluntarily withdrawn.

(6) The appellant may withdraw the appeal at any stage of the arbitration process.

(7) The appellant shall provide truthful and accurate information throughout the appeal process and shall strictly comply with all appeal procedures. Under no circumstances shall any participant disrupt the order of the competition venue or interfere with the normal operation of the competition through inappropriate or disruptive conduct.

9 Competition Guidelines

9.1 Guidelines for Participating Teams

1.Participating teams shall attend all competition activities organized by the Competition Organizer and the host institution.

2.During the competition, the Team Leader, Expert Advisors, and all other team members shall not contact judges privately. Any team found to have engaged in fraud, misconduct, or any form of improper conduct shall be disqualified, and all competition results shall be declared invalid.

3.All participants shall comply with the requirements of this Technical Description and cooperate fully with all competition assessment and organizational procedures.

4.Any participating team that undermines the fairness of the competition or disrupts its normal operation shall, depending on the severity of the violation, be subject to disciplinary measures in accordance with the Rules of the BRICS Skills Development and Technology Innovation Competition, including a warning, disqualification, invalidation of competition results, or public notification of misconduct. Where a violation has a significant impact on the competition or related activities, the Competition Organizer may notify the relevant educational administrative authority or the participating institution for further administrative or disciplinary action in accordance with applicable regulations. Any conduct involving criminal offences shall be referred to the competent judicial authorities.

9.2 Guidelines for Team Leaders

1.Team Leaders shall attend the pre-competition Team Leaders' Meeting on time and shall not

not be absent without valid justification.

2. Team Leaders are responsible for organizing their participating teams to attend all official competition activities.

3. Team Leaders shall provide effective support to their participating teams and coordinate communication between the participating team, the Competition Organizing Committee, and the host institution.

4. Team Leaders are responsible for submitting appeals. If a participating team believes that any competition equipment, tools, software, judging decisions, awards, or staff conduct does not comply with the Competition Rules or compromises the fairness of the competition, the Team Leader shall submit a written appeal to the Arbitration Panel within two (2) hours after the completion of the competition.

5. Team Leaders shall educate and guide competitors to participate in the competition in a professional and responsible manner, actively cooperate with the Competition Organizer, and ensure that any disputes arising during the competition are handled strictly in accordance with the prescribed procedures. Competitors shall not publish false information, misleading statements, or inappropriate comments through competition-related WeChat groups, QQ groups, or any other communication platforms.

9.3 Guidelines for Expert Advisors

1. All participating teams shall uphold the highest standards of professional ethics, comply with the instructions of competition officials, respect the decisions of the judges, and refrain from any form of fraud or misconduct. Any violation shall result in disqualification, and all competition rankings and results shall be declared invalid.

2. Team Leaders shall ensure full compliance with all Competition Rules, strengthen the management of their participating teams, make adequate pre-competition preparations, and ensure that competitors bring all required identification documents and competition materials.

3. During the competition, only competitors, authorized judges, designated competition staff, and other personnel specifically approved by the Competition Organizer may enter the competition venue. Team Leaders, Expert Advisors, and all other unauthorized personnel shall not enter the competition area.

4. If a participating team has any objection to the competition process, the Team Leader shall submit a written appeal to the Arbitration Panel within the prescribed time limit.

5. Team Leaders shall accept and comply with the final arbitration decision and assist competitors in understanding and implementing the decision. Competitors shall not suspend or withdraw from the competition as a result of submitting an appeal or expressing dissatisfaction with an arbitration decision. Any competitor who refuses to continue the competition for such reasons shall be deemed to have withdrawn from the competition.

6. Expert Advisors shall regularly review official competition announcements and notices published on the official competition website, thoroughly study this Technical Description, technical specifications, and venue requirements, and provide competitors with comprehensive technical guidance and pre-competition preparation.

9.4 Guidelines for Competitors

1. Once a competitor's registration has been confirmed, no substitution shall be permitted in principle. If, during the preparation period, a competitor is unable to participate due to exceptional circumstances, the participating institution shall submit a written explanation, nominate a replacement who satisfies the eligibility requirements, and obtain approval from the Competition Org

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anizer. After the competition has commenced, competitors shall not be replaced. A team member may be absent if necessary, but no replacement competitor shall be permitted. Likewise, Expert Advisors may be absent but shall not be replaced.

2.Competitors shall strictly comply with all competition regulations, operating procedures, and technical standards. They shall ensure the safety of themselves and the competition equipment, follow the instructions and warnings issued by the judges, and conduct themselves in a professional and sportsmanlike manner throughout the competition.

3.Competitors shall enter the Competition Venue with valid competition identification and shall wear their competition identification badge at all times while in the competition area for inspection purposes.

4.Competitors shall not bring any books, printed reference materials, communication devices, or external storage devices (such as USB flash drives) into the competition venue. Electronic technical reference materials required for the competition will be provided by the Competition Organizer. All computers and competition software required for the competition shall also be provided by the Competition Organizer.

5.Each participating team shall enter the competition venue during the designated familiarization period on the day before the competition. Upon entering the venue, competitors and competition staff shall jointly confirm the operating conditions of the workstations and equipment. Competitors shall verify that all required materials, tools, and equipment are complete and in proper working condition before the competition begins.

6.Competitors shall not operate any equipment before the official start signal is given. All competition tasks shall be completed only at the assigned workstation. Any form of cheating or dishonest conduct is strictly prohibited.

7.During the competition, if a team is unable to continue due to a serious operational error

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or a safety incident, the Field Judge has the authority to suspend that team's participation.

8.Competitors shall remain within the competition venue throughout the competition. Food and drinking water will be provided by the Competition Organizer. Any time spent resting, eating, drinking, or using restroom facilities shall be included within the official competition time.

9.Competitors who leave the competition venue before the end of the competition session shall not be permitted to re-enter the venue on the same day.

10.To promote professional workplace standards, competitors shall maintain their workstations in accordance with the principles of 5S—Sort, Set in Order, Shine, Standardize, and Sustain. If a workstation is considered excessively disorganized or untidy, judges may apply appropriate score deductions in accordance with the Assessment Criteria.

11.If a non-human equipment failure occurs during the competition, the competitor may request additional competition time through the Chief Judge after confirmation by the responsible judge. Additional time shall be granted only for the period required to resolve the equipment failure.

12.Competitors who wish to complete the competition before the official end time shall raise their hand to notify a judge. The judge shall record the official completion time. Once a competitor has completed the competition, no further competition-related activities or operations shall be permitted.

13.Each participating team shall submit all required competition deliverables in accordance with the Competition Rules and the requirements of the Competition Test Project. Competitors shall not place any marks, symbols, or other identifiers unrelated to the competition on any submitted deliverables.

14.Upon completion of the competition, competitors shall confirm that all required files have been successfully submitted. The responsible judge shall record the submission, and both the j

judge and the competitors shall sign the official confirmation form.

9.5 Guidelines for Staff

1.All staff members of the competition must obey unified command and provide competition services with a highly responsible attitude.

2.All staff members shall arrive at their assigned posts on time according to their designated work zones, fulfill their duties conscientiously, handle temporary tasks when necessary, and ensure the smooth progress of the competition.

3.All staff members must wear identification badges. They are required to carefully check credentials, and only after verification is confirmed can relevant personnel be allowed to enter designated areas.

4.In case of emergencies, staff must report promptly and carry out proper guidance and evacuation measures to prevent major incidents and ensure the successful completion of the competition.

5.Heads of each working group must remain at their posts, organize and ensure efficient completion of tasks by group members, and perform supervision and coordination duties.

6.All staff members are not allowed to make or answer phone calls within the competition venue to ensure the proper functioning of on-site equipment.

9.6 Judges' Instructions

1.The judging panel implements a "Chief Judge Responsibility System." It consists of 1 chief judge, 2 deputy chief judges, and 1 supervision and arbitration officer. Each participating institution may recommend one instructor to serve as a judge. Specific assignments shall be announced by the chief judge at the judges' meeting.

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2. Judges shall strengthen integrity awareness and are not allowed to engage in improper conduct or commercial promotion under the name of the competition. All judges must sign a commitment letter and strictly observe confidentiality requirements. Judges shall not contact contestants or teams privately or disclose any competition-related information.

3. During the competition, judges must wear unified attire and identification badges, behave in a professional and courteous manner, and accept supervision from participants.

4. Judges must strictly observe competition rules, implement competition regulations, and obey the leadership of the organizing committee and chief judge. In case of issues or disputes during the competition, decisions of the chief judge shall be followed. Judges shall perform duties according to assigned roles, remain at their posts, and shall not leave without permission. They must not provide hints or explanations related to the competition content to participants, and must promptly stop any rule violations by competitors. Any controversial technical issues or emergencies must be handled properly and reported to the chief judge in a timely manner.

5. No judge shall interfere with contestants' normal performance during the competition.

6. Judges must strictly follow the scoring criteria, ensuring fairness, justice, authenticity, and accuracy. Arbitrary scoring is strictly prohibited. Any form of misconduct, fraud, or favoritism is strictly forbidden.

7. Judges must attend pre-competition training; otherwise, they will be disqualified.

8. Any judge or judging team member who commits any of the following will be placed on the "Competition Violation List" and permanently disqualified from serving as experts, judges, supervisors, arbitration staff, contestant instructors, or competition staff in the BRICS Skills Development and Technology Innovation Competition. Their affiliated institutions and relevant authorities will also be notified:

(1) Violating competition rules or regulations.

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(2) Privately using social media platforms such as WeChat or QQ, or other means, to disclose or publish confidential or inaccurate competition information.

(3) Failing to perform duties without justification, being late or absent without reason, or failing to report to duty twice.

9.7 Registration Instructions

To ensure the smooth operation of the competition, all participating teams must register within the specified time. Please note the following:

1. Participants must bring valid identification documents such as ID cards and student IDs (or teacher qualification certificates). During registration and verification, participants must present their ID card, student ID (or teacher qualification certificate), and competition insurance certificate for eligibility verification. Participants with incomplete documents will not be allowed to compete.

2. Participants must submit photocopies of their ID cards (A4 size, front and back on the same page), photocopies of student IDs (or teacher qualification certificates, A4 size), and one copy of accident insurance certificate.

3. Participants must complete the registration form and ensure that contact information remains valid throughout the competition period.

4. Verify participant information and complete check-in procedures. After accommodation arrangements are completed, participants will receive competition materials, including: team leader badge, instructor badge, participant badge, competition uniform, and competition handbook.

10 Competition Awards

10.1 Gold, Silver, Bronze, and Merit Awards

BRICS+ participating teams shall be ranked in a unified overall ranking. The top six domestic and international teams will be awarded Gold, Silver, and Bronze medals and corresponding certificates.

For offline participating teams that do not receive Gold, Silver, or Bronze medals but achieve outstanding performance, Merit Awards and certificates will be issued (limited to a maximum of 3 teams).

The award allocation rules are as follows:

(1)The top-ranked team from each participating country is eligible to enter the Gold Medal ranking. The highest-ranked team overall will be awarded the Gold Medal.

(2)Excluding Gold Medal teams, the best-performing team from each participating country is eligible to enter the Silver Medal ranking. The top two teams in this category will be awarded Silver Medals.

(3)Excluding Gold and Silver Medal teams, the best-performing team from each participating country is eligible to enter the Bronze Medal ranking. The top three teams in this category will be awarded Bronze Medals.

(4)Offline participating teams that do not receive Gold, Silver, or Bronze medals but demonstrate excellent performance will be awarded Merit Awards (limited to 3 teams).

(5)Online international participating teams will not receive physical medals; instead, corresponding award certificates will be issued.

10.2. First Prize, Second Prize, and Third Prize

For Chinese teams participating in the International Finals of the China Division, awards shall be allocated based on the rounding principle as follows:

- (1) First Prize: 10%
- (2) Second Prize: 20%
- (3) Third Prize: 30%

Corresponding international award certificates will be issued. All remaining teams will receive an Excellence Award certificate.

10.3 Other Awards

1. Judges participating in evaluation and adjudication will be issued International Judging Certificates.

2. Instructors of teams awarded First Prize and Second Prize will be issued International Outstanding Instructor Certificates.

3. Units that have made outstanding contributions to the organization of the competition will be awarded the plaque and certificate of “Outstanding Contribution Award.”

4. Provincial or regional organizing units that actively organize participation, conduct pre-competition selection and training, and maintain full compliance without any violations during the competition will be awarded the certificate of “Excellent Organization Award.”

10.4 Other Awards

Participants whose total team score reaches 60 points or above (on a 100-point scale) may voluntarily apply for the Level A “Skills Passport” certificate (see subsequent application notice

for details).

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11 Health and Safety

Event safety is a fundamental prerequisite for the smooth implementation of all competition activities and a core issue that must be fully considered during both preparation and operation of the competition. The Organizing Committee shall adopt effective measures to ensure the personal safety of all participants during the competition period, including contestants, instructors, coaches, experts, judges, technical support staff, and volunteers.

11.1 Safety Prevention Measures

1.Participants must verify whether competition equipment is safe and in proper working condition in accordance with relevant regulations. They shall strictly comply with venue rules and operational procedures, ensure personal and equipment safety, and accept supervision and safety warnings from judges. Civilized participation is required at all times.

2.Participants must fully understand the technical parameters and performance specifications of the competition equipment before use to ensure proper operation.

3.Participants are strictly prohibited from touching 220V high-voltage power sockets at competition workstations. Electrical safety must be strictly observed.

4.Dependent on team allocation, 5%–10% redundant hardware equipment shall be prepared to prevent disruptions caused by equipment failure during the competition.

5.To prevent unexpected power outages, the host institution shall prepare generators or backup power supply solutions to ensure the uninterrupted operation of the competition.

11.2 Safety Management Requirements

1.The Executive Committee of the competition must assign personnel in advance to inspect the competition venue, accommodation facilities, and transportation arrangements, and issue clear safety requirements. The layout of the venue, as well as all equipment and facilities, must comply with relevant national safety regulations. If necessary, simulated venue testing may be conducted to identify potential risks. The host institution must eliminate all safety hazards prior to the competition in accordance with the requirements of the Executive Committee.

2.Safety perimeter zones must be established around the competition venue to prevent unauthorized access. Dedicated personnel shall be assigned for security supervision to prevent accidents.

3.The host institution must develop and implement emergency response plans in advance, clearly defining systems and procedures, and ensuring the availability of first-aid personnel and medical facilities.

4.The Executive Committee, in coordination with the host institution, shall formulate crowd management and guidance plans for open venues and experience areas. In addition to clear signage, additional guidance staff shall be deployed and alternative passageways shall be established.

5.During the competition period, the host institution shall strengthen security

y staffing at key management positions, conduct continuous safety inspections, and establish a safety management log system.

6. When participants and judges enter designated competition areas, the host institution is responsible for reminding and ensuring that mobile phones, photography, video recording devices, and any unauthorized equipment are strictly prohibited. If necessary, such items shall be uniformly provided and managed by the venue. Security screening equipment may be deployed to conduct inspections for personnel entering critical areas.

11.3 Living Conditions

1. Accommodation arranged during the competition must hold valid hotel or lodging operation licenses.

2. During the competition period, accommodation and meals for participants and instructors shall, in principle, be uniformly arranged by the host institution. The host institution must respect the religious beliefs and cultural customs of ethnic minority participants and properly arrange their dietary and living needs in accordance with relevant national ethnic and religious policies.

3. The Competition Organizing Committee and the host institution must ensure transportation safety for participants, instructors, judges, and staff during the competition period.

4. Safety management for all competition events shall strictly comply with relevant national laws and regulations, and personal privacy and individual freedom shall be protected.

11.4 Emergency Handling

In the event of an accident during the competition, the discoverer shall immediately report to the Competition Executive Committee and take appropriate measures to prevent escalation. The Executive Committee shall promptly activate the emergency response plan and report to the National Competition Organizing Committee.

In the event of major safety or public health incidents, the competition may be suspended. The decision to suspend the competition shall be made by the National Competition Organizing Committee.

11.5 Penalties

1. In the event of a major incident during the competition, the hosting qualification of the organizing institution shall be revoked.

2. If a major incident is caused by a participating team, the team shall be disqualified from the competition.

