2025

BRICS SKILLS COMPETITION

(BRICS FUTURE SKILLS AND TECHNOLOGY CHALLENGE)

Urban Rail Transit Operation Design and Emergency Management

BRICS-FS-35

Technical Description

(International Finals_Onsite)

Catalogue

1. Introduction

1.1 Name and description of skills

1.1.1 Name of the skills competition

Name of the competition: Urban rail transit operation design and emergency handling

English name: Urban Rail Transit Operation Design and Emergency Management

Industry: Transportation

1.1.2 Description of skills competition

This competition is a major event held against the backdrop of the BRICS countries' commitment to deepening BRICS partnership and forging a brighter future. It aims to promote the application of urban rail transit operation design and emergency response technology among the five BRICS countries and Belt and Road through exchanges and cooperation among member states, and to integrate the technical skills of rail transit operation design with contemporary innovations. The competition focuses on the technical skills of urban rail transit operation management, where participants use relevant technologies and skills to complete skill tasks or innovative designs. The competition primarily covers the following areas:

(1) Assessment of professional knowledge of urban rail transit operation and management. According to the professional knowledge, basic theory and technical skills of urban rail transit operation and management, the theoretical answers are answered on the assessment platform, and the theoretical knowledge assessment is

completed within the specified time.

(2) The layout of station facilities and equipment, along with the design of passenger flow lines. Based on the daily time-segmented passenger flow data for the given station, complete the layout design of station facilities and equipment and the design of passenger flow lines within the specified time frame. After the design is completed, evaluate the quality of the station's equipment layout and passenger flow line design by analyzing the cost, efficiency, rationality, and length of the pedestrian flow lines.

(3) Design of train operation scheme. According to the daily time-segment OD passenger flow data, train capacity, operating time, service level restrictions and other given lines, the design of train operation scheme includes train routes, train stop plan and daily time-segment number of trains.

(4) Operation diagram editing and simulation. Based on the basic data of a specific rail transit line, passenger flow data, train operation schedules, and capacity allocation plans, the operation diagram is designed within a specified timeframe. During the design process, each train must meet the minimum stop time, the shortest turnaround time, the start and end operation times, and the interval between train intervals. After the design is completed, the operation diagram is imported into the system for simulation. Following the simulation, the operation diagram's quality is evaluated by outputting indicators such as operating costs, passenger waiting times, occupancy rates, and comfort levels.

(5) Preparation of the vehicle base operation plan. Based on the urban rail transit lines, train schedules, and operational diagrams, the plan assigns vehicle bases to train services within a specified timeframe, assessing the contestants' ability to

develop such plans. After the plan is completed, it evaluates the quality of the vehicle base operation plan by outputting indicators such as the number of vehicle bases, connection times, and the balance of vehicle base usage.

(6) Preparation of the crew plan. Based on the urban rail transit lines, operation schedules, and vehicle utilization plans, train operation tasks are assigned to the crew members within a specified time frame. This process evaluates the crew members' ability to prepare the crew plan. After preparation, the quality of the crew plan is assessed by outputting indicators such as the number of crew members, the total working hours, and the combined rest periods.

1.2 Relevance and importance of the document

This document contains the standards required for this skills competition, as well as information on the evaluation principles, methods and procedures for managing the competition.

Each expert and contestant must understand this technical description.

In the event of any conflict between technical descriptions in different languages, the English version shall prevail.

2. Skill standards

2.1 General description of skill standards

The skill standards define knowledge, understanding and specific skills that are international best practices in technology and occupational performance. It will reflect the global consensus on the representation of relevant job roles or occupations in industry and business.

The skills competition is designed to reflect the international best practice described in the skill standard and the extent to which it can be achieved. Therefore, the standard is a guide to the training and preparation required for the skills competition.

The standard is divided into different sections with headings and reference numbers.

Each section is assigned a percentage of the total score to indicate its relative importance in the criteria. This is often referred to as "weight". The total score of all percentages is 100. Weight determines how points are allocated in the scoring criteria.

Through the competition questions, the scoring scheme only evaluates the skills listed in the standards. They will reflect the standards as comprehensively as possible under the constraints of the skills competition.

The scoring scheme will be based on the scores assigned in the criteria, within the practical possibility of doing so, allowing for a 5 per cent variation but not altering the weights assigned by the standard specification.

2.2 Skill standards

Part	Type of skill	Weight（%）
1	Work organization and management	
–	Players need to understand and understand: – Principles and methods for the implementation of safety work; – The use, use, maintenance and maintenance of all equipment	

	and materials and their impact on safety; – Principles of environment and safety and their application in good workshop management; – Principles and methods of work organization, control and management; – Communication and cooperation principles; – The scope and limits of the roles, responsibilities and obligations of individuals and others, individually or collectively; – Parameters to be followed when planning activities; – Principles and techniques of time management.	
–	The candidate should be able to: – Prepare and maintain a safe, clean and efficient work area; – Prepare for the task at hand and give full consideration; – Organization of work to maximize efficiency and minimize schedule disruptions; – Restore the working area to an appropriate state; – Contribute to teamwork and organizational performance in both general and specific ways; – Provide and receive feedback and support.	
2	communication skill	
–	The candidate should be able to: – Understanding tasks; – Show your project professionally;	

	– Express your ideas clearly; – be punctual ; – Persuade others to believe in the advantages of the proposed solution; – Be ready to answer questions; – play the game 。	
3	Urban rail transit operation management professional knowledge assessment	30
-	Players need to understand and understand: - theory of foundations ; -Composition of rail transit system; -Principles of operation organization; - management standard ; -Passenger service of urban rail transit stations;	
-	The candidate should be able to: – Understanding tasks; – be punctual ; – Be ready to answer questions; - play the game 。	
4	Urban rail transit station passenger transport organization	20
–	Players need to understand and understand: – Basic layout of urban rail station; – Station passenger flow characteristics analysis;	

	– Passenger station service process; – Methods of using facilities and equipment in the station; – Station passenger flow organization method;	
–	The candidate should be able to: – Determine the quantity and model of key equipment (gate, security check machine, etc.) according to passenger flow; – Determine the placement of various facilities and equipment according to the station form and passenger flow; – The passenger flow line between the station and the station is designed according to the layout of the station equipment; – Simulation according to the layout of equipment and passenger flow line; – Adjust and optimize according to the simulation results.	
5	Urban rail transit operation plan preparation	50
	Players need to understand and understand: – The concept and connotation of inter-station OD passenger flow; – Calculation method of cross-sectional passenger flow; – The connotation and basis of the operation plan; – Train operation organization mode; – The connotation and calculation method of transport capacity allocation plan; – The concept, function, preparation method and key technology of train running chart;	

	– Calculation method of train running chart index; – Basic concepts in the preparation of undercarriage utilization plans; – Methods for compiling bottom use plans; – Basic concepts in the preparation of cabin plans; – Methods for preparing cabin plans;	
	The candidate should be able to: – The cross-sectional passenger flow is calculated according to OD passenger flow; – The operation plan is determined according to the size and law of section passenger flow; – Draw the operation map according to the operation plan; – The passenger flow and vehicle flow are simulated and optimized in parallel according to the operation diagram; – Prepare the bottom utilization plan according to the operation chart and the bottom situation; – Make cabin plans according to the operation chart and the condition of the cabin crew.	

3. Scoring scheme

3.1 Scoring method

The competition focuses on the industry standards of urban rail transit, the job skills required in the urban rail transit sector, and the teaching principles and standards of relevant majors in educational institutions. The evaluation content and

scoring criteria are set based on these standards. The competition combines process and outcome evaluations, as well as skill and professional ethics assessments, to assess the overall quality of the participants. The scoring criteria are established with the principles of 'scientific rigor and objectivity' in mind.

3.2 Scoring rules

1. The higher the total score, the higher the ranking; if the total scores are the same, the higher the module score in the order of Module C, Module B, Module D, and Module A (see Section 4.2 for details on each module); if the above two rules cannot determine the ranking, the shorter cumulative competition time will be used to determine the ranking.

2. The scoring method of step-by-step scoring and cumulative total score is adopted for each competition item. The scores are calculated separately between each module, and the errors between modules are not passed on. The scores of each competition item and the total score of each competition are scored according to the percentage system.

3. Principle of independent scoring. Before scoring, the judges will randomly draw lots to divide groups to eliminate subjective team formation. Each judging group will score independently according to the competition module, and the total score will be counted after scoring to ensure that the results are objective, rigorous and accurate.

4. To ensure the accuracy of the results, the competition executive committee will recheck the scores of all teams ranking in the top 30% of the total competition results. For the remaining teams, a random recheck will be conducted, with a minimum

coverage rate of 15%. If any errors are found during the recheck, they must be promptly reported in writing to the chief referee, who will correct the scores and sign for confirmation. If the error rate in rechecks and random checks exceeds 5%, the entire competition results will be rechecked by the referee group.

5. During the competition, if the participants have uncivilized behaviors such as disturbing the order of the competition, interfering with the normal work of the judges and invigilators, the chief referee will deduct the corresponding score of the special event. In serious cases, the qualification of the competition will be cancelled, the competition result will be 0 points, and the team members will withdraw from the competition site.

6. Participants are not allowed to mark the results of the competition with marks containing the information of the participating team. If found, they will be disqualified from the evaluation of awards.

3.3 Scoring rules

The scoring criteria for each module are as follows, with appropriate variations in the scoring details for different questions.

Table 1 Evaluation rules

<table>
<tr><th>No.</th><th>Assignment</th><th colspan="2">Assessment content and scoring rules</th></tr>
<tr><td></td><td></td><td colspan="2">Test content: Answer the theoretical questions provided by the assessment platform</td></tr>
<tr><td></td><td></td><td>Task steps and requirements</td><td>code of points</td></tr>
<tr><td>1</td><td>Urban rail transit operation management professional knowledge assessment</td><td>Complete the test questions within the specified time</td><td>Each question will be graded according to the score. If you answer correctly, you will get extra points; if you make a mistake, you will lose points</td></tr>
<tr><td rowspan="3">2</td><td rowspan="3">Station facilities and equipment layout and passenger flow line design</td><td colspan="2">Test content: In this task, the participants are required to complete the layout design of station facilities and equipment and passenger flow line design within a specified time according to the full-day passenger flow data of the given station.</td></tr>
<tr><td>Task steps and requirements</td><td>code of points</td></tr>
<tr><td>1. According to the given passenger flow data and station passenger service requirements, calculate the number and model of the required equipment, and determine the placement of the equipment;
2. Draw the flow line of passengers entering and leaving the station according to the placement</td><td>1. Total Cost Calculation of In-Station Equipment: Calculate the total cost of all equipment used by all participants, which accounts for 20% of Task 1's total score. (Participants are ranked based on their cost efficiency, with the lowest cost being the best. When there are n participants, the m-th participant's score is calculated using the formula: Score = (n + 1-m) / n × 100 × 20%).</td></tr>
</table>

		of station equipment; 3. Simulate the passenger flow of the completed station according to the design, and output the cost;	2. Evaluation Criteria for Station Operation Indicators: Monitor the number of people waiting at the entry and exit gates during the simulation (statistical interval is 1 minute). The waiting number is categorized into four levels: 1-20 people, 21-40 people, 41-80 people, and over 80 people. After the simulation, count the number of times each participant falls into each waiting level. For each occurrence of the 21-40 people level, deduct 2 points; for each occurrence of the 41-80 people level, deduct 4 points; for each occurrence of the over 80 people level, deduct 6 points, until all points are deducted. This score accounts for 35% of the total score for Task 1 (score = (100-total deductions) × 35%). 3. Average streamline design length: the best ranking is to meet the requirements of task rules and have the shortest streamline design length. When the number of players is n, the ranking m of players is calculated according to the following formula: score = (n+1-m)/n×100×35%). This section accounts for 35% of the total score of Task 1. 4. Compliance and Aesthetics of Equipment Placement: Count the placement and quantity of all equipment used in the station. Points will be deducted for missing

<table>
<tr><td></td><td></td><td></td><td>certain equipment, such as failing to place an explosion-proof bucket. Points will also be deducted for placing equipment in inappropriate locations, such as placing elevator signs at the entrance, until all points are deducted. This section accounts for 10% of the total score for Task 1.</td></tr>
<tr><td rowspan="3">3</td><td rowspan="3">Train operation scheme design and operation diagram editing</td><td colspan="2">Test content: In this task, the participants make a running plan according to the given line passenger flow data, draw the running chart according to the running plan, and finally simulate the running chart.</td></tr>
<tr><td>Task steps and requirements</td><td>code of points</td></tr>
<tr><td>1. Passenger flow data processing and analysis;
2. Determine the route scheme and stop scheme according to the time and space characteristics of passenger flow;
3. Determine the running time of the first and last trains according to the business hours;
4. Determine the number of trains running at different times of each route according to the section passenger flow;
5. Draw the operation map according to the operation plan;
6. Apply the drawn operation map to simulate passenger flow;</td><td>1. Train Operation Cost Calculation: During the preparation of the operation chart, different train types are selected to correspond with their respective operation costs. Based on the number of trains and their models in the operation chart, the operation costs are calculated. This section accounts for 25% of the total score for Task Two. (The benchmark cost is determined by meeting the task rules and achieving the lowest total cost. Other participants' scores are calculated using the formula: Score = (Benchmark Cost / Actual Cost) × 100 × 25%).

2. Evaluation criteria for passenger waiting time: The waiting time of passengers during the simulation process is measured, and this</td></tr>
</table>

			score accounts for 20% of the total score for Task Two. (The score is calculated using the following formula: Score = (100-Deduction Points) × 20%, where Deduction Points = (Number of passengers with a waiting time between 6min and 14min) / Total number of passengers entering the station * 25 + (Number of passengers with a waiting time of 14min or more) / Total number of passengers entering the station * 75.) 3. Passenger comfort evaluation standard: The score here accounts for 15% of the total score of Task 2; the average passenger comfort during the statistical simulation process is calculated by using a segmented scoring method, which is divided into three gradients. 4. Evaluation criteria for train full load rate: This section accounts for 15% of the total score for Task Two. During the statistical simulation, the average full load rate of vehicles (the average of all intervals) is used as the benchmark full load rate, which must meet the character rule requirements and have the lowest full load rate among all participants. The scores for other participants are calculated using the formula: Score = (Benchmark Full Load Rate / Actual Full Load Rate × 100%) × 15;

			5. The passenger retention evaluation standard accounts for 25% of the total score for Task Two. After all trains have completed their operations during the statistical simulation, the number of passengers who have not boarded is counted. Points are deducted based on the number of retained passengers. The scoring for passenger retention at the station (total deduction = 1/2n * (deduction at Station 1 + deduction at Station 2 +... + deduction at Station n)) is calculated as follows: the final score is 100 minus 25% of the total deduction.
		The examination content involves assigning carriages to train services based on the urban rail transit lines, train schedules, and operation diagrams, and completing the carriage utilization plan. Additionally, it includes allocating train operation tasks to crew members based on the urban rail transit lines, train schedules, and carriage utilization plans, and completing the crew scheduling plan.	
		Task steps and requirements	code of points
4	Car undercarriage utilization plan and crew plan preparation	The preparation steps of the vehicle bottom application plan are as follows: 1. Determine the use mode and regulations of the car bottom; 2. Operation task continuation; 3. Assign running tasks to specific chassis. The preparation steps of the	1. Calculation of the number of carriages: Calculate the total number of carriages required to complete all train tasks. This section accounts for 30% of Task Three's total score (based on the maximum and minimum numbers that meet the task requirements. Other contestants' scores are calculated using the formula: Score = ((Maximum

		cabin plan are as follows: 1. Determine the base and station for duty; 2. Divide the service segment; 3. Generate the service operation section; 4. Generate the cabin crew team; 5. Assign the cabin crew to specific flight attendants.	Number-Actual Number) / (Maximum Number-Minimum Number)) × 100 × 30%). 2. Calculation of the total connection time for all carriages: The total connection time for all carriages during the entire day's operation is calculated, with this score accounting for 10% of Task Three's total score (based on the carriage with the longest and shortest connection time that meets the task requirements; other contestants' scores are calculated using the formula: Score = ((Longest Time-Actual Time) / (Longest Time-Shortest Time)) × 100 × 10%). 3. Evaluation of the Evenness of Vehicle Undercarriage Usage: Calculate the variance by tallying the total daily mileage of all vehicle undercarriages. This section accounts for 10% of the total score for Task Three (using the vehicles with the best and worst evenness as benchmarks. Scores for other participants are calculated using the formula: Score = ((Worst Evenness-Actual Evenness) / (Worst Evenness-Best Evenness)) × 100 × 10%). 4. Crew Member Counting: Determine the number of crew members required to complete all train tasks. This section accounts for 30% of the total score for Task Three (the score is based on the

			scenario where the crew member count is both the highest and the lowest among all participants. For other contestants, the score is calculated using the formula: Score = ((Maximum Number-Actual Number) / (Maximum Number-Minimum Number)) × 100 × 30%). 5. Break Time Difference and Calculation: Calculate the difference between the actual rest time and the standard rest time for all flight attendants. This section accounts for 10% of Task Three's total score (based on meeting the task requirements and finding the maximum and minimum break time differences; other participants' scores are calculated using the formula: Score = ((Maximum Difference-Actual Difference) / (Maximum Difference-Minimum Difference)) × 100 × 10%). 6. Total working hours calculation: The total duration from the start to the end of each crew member's shift is recorded. This accounts for 10% of Task Three's total score, based on meeting the task requirements and considering the differences in rest periods and the maximum and minimum values. For other participants, the score is calculated using the formula: Score = ((Maximum difference-Actual difference) / (Maximum difference-Minimum

			difference)) × 100 × 10%.

4. Competition questions

4.1 Common Precautions

Whether a single module or a series of independent or related modules, the competition questions can evaluate the application of knowledge, skills, and behaviors defined in the Skill Specification.

Combined with the scoring scheme, the purpose of the competition questions is to provide a comprehensive, balanced and realistic opportunity for standard evaluation and scoring. The relationship between the competition questions and the scoring scheme and the standards will be a key indicator of quality, just as the relationship between the standards and actual performance.

The competition questions do not include aspects outside the standards, nor do they affect the balance of scoring within the standards.

The competition questions are evaluated only through their application in actual work.

4.2 Competition question framework

The competition consists of four relatively independent and related modules:

Module A: Assessment of professional knowledge of urban rail transit operation and management

Module B: Layout of station facilities and equipment and design of passenger flow line

Module C: Train operation scheme design and operation diagram editing

Module D: Bottom application plan and crew planning

4.3 Time allocation and score weight of competition questions

module	duration (min)	Score weight (%)
Module A: Assessment of professional knowledge of urban rail transit operation and management	40	30
Module B: Layout of station facilities and equipment and design of passenger flow line	60	20
Module C: Train operation scheme design and operation diagram editing	60	30
Module D: Bottom application plan and crew planning	60	20
amount to	220	100

4.4 Module operation content and requirements

The urban rail transit operation design and emergency handling competition consists of four modules, including: professional knowledge assessment of urban rail

transit operation management, station facilities and equipment layout and passenger flow line design, train running scheme design and operation chart editing, car bottom utilization plan and service plan preparation, etc., which comprehensively examines the professional technical ability of the contestants.

Module A: Assessment of professional knowledge of urban rail transit operation and management: The assessment is carried out on the platform of professional knowledge assessment of urban rail transit operation and management, and the questions issued by the teacher are answered one by one.

Module B: Layout of station facilities and equipment and design of passenger flow line: The assessment is carried out in the urban rail transit operation design simulation system. The contestants need to design the layout of station facilities and equipment and passenger flow line according to the passenger data issued by the system;

Module C: Train operation scheme design and operation diagram editing: The assessment is carried out in the urban rail transit operation design simulation system. The contestants need to design the operation scheme and draw the operation diagram according to the line operation data issued by the system;

Module D: Underfloor operation plan and crew plan preparation: The assessment is carried out in the urban rail transit underfloor operation plan preparation system and crew plan editing system. The contestants need to formulate the train operation plan and crew plan according to the established running chart, and ensure that the relevant requirements are met;

number	Module name	Scope of work
A	Urban rail transit operation management professional knowledge assessment	The scope of this examination can be referred to the vocational skills appraisal question bank
B	Station facilities and equipment layout and passenger flow line design	1. According to the daily passenger flow of the given station, determine the quantity, location and model of various facilities and equipment (such as ticket vending machines, ticket checking machines, security gates, etc.) in the station, so that various facilities and equipment can provide excellent travel services for passengers; 2. According to the layout of key equipment in the station, the flow line of passengers entering and leaving the station is drawn to ensure the smooth transportation process of passengers, improve the efficiency of passengers' travel and avoid crowding;
C	Train operation scheme design and operation diagram editing	1. According to the full-day time-segment OD data of the given line, calculate the number of passengers arriving and departing at each station along the line, the number of people sent in different directions at each station, and the section passenger flow in full-day time-segment, so as to analyze the spatial and temporal distribution characteristics of the whole line passenger flow; 2. According to the time and space characteristics of

		passenger flow on the line, determine the train operation organization mode, including train route scheme, train stop scheme, transport capacity allocation plan, etc., so as to form the train running scheme; 3. Based on the train operation plan, minimum running intervals, interval running times, and turnaround dwell times, which are determined by passenger flow demand, a train operation chart is created. The chart is then imported into the system for simulation. After the simulation, the quality of the operation chart is evaluated based on indicators such as operating costs, passenger waiting times, occupancy rates, and comfort levels;
D	Car undercarriage utilization plan and crew plan preparation	1. According to the urban rail transit line, train route, operation chart and other data, the system assigns the car base for the train in the operation chart, and outputs the number of car base, connection time, car base utilization balance and other indicators to evaluate the quality of the car base utilization plan; 2. According to the urban rail transit line, train route, car bottom utilization plan and other data, the train operation task is assigned to the crew members, and the system outputs the number of crew members, the difference between rest time and the total working time to evaluate the quality of the crew utilization plan;

4.5 Announcement of competition questions

The competition questions will be published on the website (http://www.brskills.com/jzzy/productjs.html).

4.6 Competition question change

Before the official competition, 30% of the competition questions will be changed.

5. Skill management and communication

5.1 Expert Group

The skills expert group, consisting of chief experts, associate chief experts and expert members, is responsible for further revising the technical documents for the remote final of the competition and for daily skills management.

5.2 Discussion forum

Before the competition, participants can enter the forum section of the technical training platform for urban rail transit operation design and emergency response technology to provide feedback on questions related to software and hardware preparation, examination environment deployment, etc. The training and exchange for this competition will also take place through the forum before, during, and after the competition.

Online communication will be conducted through wechat, an instant messaging tool, and the meeting time of offline discussion forums will be uniformly released by the Chinese organizing unit.

6. Safety requirements

6.1 Organizational structure

1. Establish a competition safety assurance team, with the head of the event executive committee serving as the team leader. Members are the safety officers from each venue. Each venue appoints a safety officer who is fully responsible for the

venue's safety. In the event of an emergency, this officer is responsible for mobilizing rescue teams and professional rescuers and arranging the evacuation of personnel within the venue.

2. Establish a coordination mechanism with relevant departments such as public security, fire control, judicial administration, transportation, health, food safety, and quality inspection to ensure the safety of the competition. Develop emergency response plans and promptly address any emergencies. Set up dedicated lines for communication with medical staff, firefighters, and security personnel, designate contact persons, and have the venue safety officer liaise with them. The layout of the competition venue and the use of equipment must strictly follow safety construction regulations. The venue should be divided into zones, with evacuation routes set up according to safety requirements, and safety evacuation route maps prominently displayed on the walls.

6.2 Safety management of events

1. The installation of competition equipment and facilities shall be carried out in strict accordance with the safety construction standards, and the power wiring and electrical installation shall be carried out in accordance with the specifications.

2. Place fire extinguishers according to fire safety requirements, and designate responsible persons to use them in emergency.

3. The competition regulations of the event specify the norms, regulations and qualification certificate requirements of relevant national (or industrial) occupational positions.

4. The organizing committee of the competition shall conduct safety training for

all judges and staff members before the competition. According to the Labor Law of the People's Republic of China and other laws and regulations, a sound safety accident prevention system shall be established and improved, and the athletes shall be trained before the competition to avoid personal injury accidents.

5. The organizing committee of the event will establish a special program to ensure the safety of the competition proposition, the storage, distribution, recovery and evaluation process.

6.3 Competition environment safety management

1. The organizing committee of the competition organizes a team to inspect the competition venue, accommodation facilities, and transportation services before the event, and sets clear safety requirements. The venue layout and equipment must comply with national safety regulations. Simulated tests are conducted to identify potential issues. Before the event, the organizing unit eliminates any safety hazards as required by the competition committee.

2. A cordon shall be set up around the competition area to prevent irrelevant personnel from entering and accidents from happening. Necessary labor protection shall be provided for the players in accordance with the requirements of relevant professional positions at the competition site. In the dangerous operation links, the referee shall check and confirm the normal equipment before the competition, and strictly prevent the players from making wrong operations during the competition.

3. In order to ensure the smooth progress of the competition, the hosting college has established a corresponding safety guarantee system during the competition, which is implemented by the security, campus environment and health care groups.

(1) During the competition, all vehicles and personnel entering the competition area should enter with certificates and show them to the staff.

(2) Before the start of the competition, players should read carefully the "Entry Notice" and emergency evacuation map posted in the venue.

(3) The referee shall supervise the whole process of checking the electrical control system before it is powered on, and timely remind and stop any operation risks.

(4) Each competition equipment uses an independent power supply to ensure safety. When the contestant is programming, he/she should save the data in time to avoid data loss caused by sudden power failure.

(5) During the competition, the participants shall strictly abide by the safety operation rules. In case of emergency, they shall immediately cut off the power supply and leave the venue in an orderly manner under the arrangement of the staff.

(6) All kinds of personnel must strictly abide by the rules of the competition, and are strictly prohibited from carrying prohibited items into the competition.

(7) Security personnel shall inform the person in charge of the stadium of potential safety risks in time.

(8) Smoking is strictly prohibited in the competition venue, and security personnel are not allowed to lend their certificates to others.

(9) In case of safety problems, evacuate the site quickly according to the emergency evacuation route under the command of security personnel.

4. The organizing committee and the host unit shall, in addition to setting up

complete signs and increasing guidance personnel, open up backup channels in densely populated areas with heavy traffic and people flow at the competition site.

5. During the competition, the organizing unit of the competition shall increase the strength in key positions of the competition site management and establish a safety management log.

6. When the participants enter the competition position and the competition judges and staff enter the workplace, the competition organizer shall remind and urge the participants and the competition judges and staff to prohibit the carrying of communication, photography and recording equipment, prohibit the carrying of unauthorized recording tools, and conduct security inspection on the personnel entering the important areas of the competition site.

6.4 Living conditions guarantee

1. During the competition, the organizing unit shall arrange the accommodation and food for the participants and instructors. The organizing unit shall respect the religious beliefs and cultural customs of the ethnic minority participants and arrange their diet and daily life in accordance with the relevant national policies on ethnic groups and religions.

2. The accommodation arranged during the competition shall have hotel and accommodation operation license.

3. The traffic safety of organized visits and observation activities during the competition shall be the responsibility of the executive committee of the competition area. The executive committee of the competition and the organizing unit shall ensure the traffic safety of the players, instructors, referees and staff during the competition.

4. In addition to necessary security isolation measures, we strictly abide by relevant national laws and regulations to protect personal privacy and personal freedom.

6.5 Responsibilities of the participating team

1. Each participating unit shall arrange to purchase personal accident insurance for the participants during the competition when organizing the team.

2. After the teams of each unit are formed, they must formulate relevant management systems and conduct safety education for all participants and instructors.

3. Each team should strengthen the safety management of the participants and coordinate with the safety management of the competition site.

4. If the team has a vehicle, they must enter and leave the competition site with the certificate issued by the organizing committee of the competition, drive along the designated route and park at the designated place.

6.6 Emergency handling

In the event of an accident during the competition, the discoverer should immediately report it to the competition executive committee and take measures to prevent the situation from escalating. The competition executive committee should promptly activate the emergency plan to address the issue. In cases of major safety issues, the competition zone executive committee will decide whether to suspend the competition. After the incident, the competition zone executive committee must provide a detailed report on the situation.

6.7 Punishment measures

1. If a major safety accident occurs in the event, the qualification of the organizer to host the event shall be suspended.

2. If a major safety accident is caused by the participating team, it will be disqualified from the award.

3. If the participating team has a major safety accident hazard and fails to be warned by the staff of the competition venue, it will be disqualified from continuing the competition.

4. If the competition staff violates the rules, they shall be held accountable according to the corresponding system. If the circumstances are bad and cause major safety accidents, the judicial organs shall investigate the corresponding legal responsibilities.

7. Materials and equipment

7.1 Infrastructure inventory

The infrastructure list details all the equipment and facilities that participants need to prepare. See "Infrastructure List for Urban Rail Transit Operation Design and Emergency Handling in the Offline Competition of BRICS Skills Competitions 2025".

7.2 Technology Platform

Each competition position has a set of competition equipment and technical platform, so that each competition position can independently carry out competition related operations.

The technical platform includes urban rail transit operation design simulation

system, car bottom application plan preparation system, urban rail transit service plan preparation system and urban rail transit dispatching system training and assessment device.

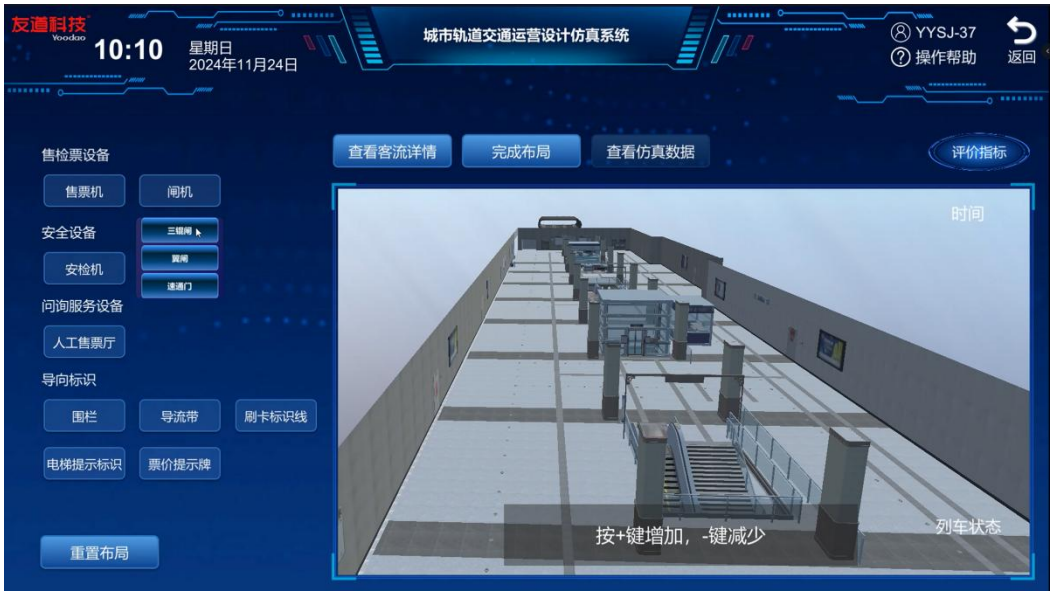
1. Urban rail transit operation management professional knowledge assessment platform

Urban rail transit operation management assessment platform is mainly used to assess students' relevant professional knowledge and basic theoretical content;

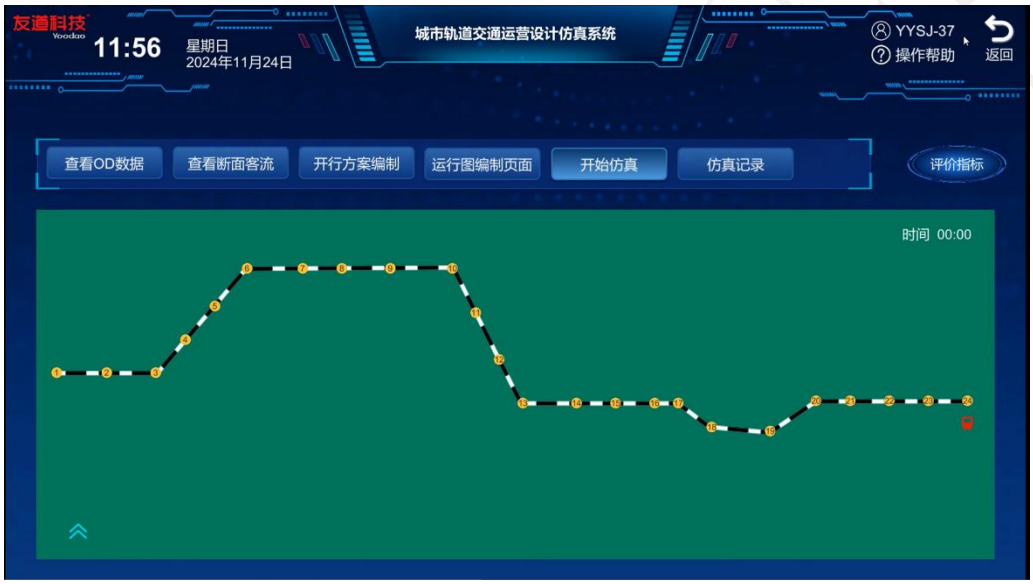
2. Urban rail transit operation design simulation system

The urban rail transit operation design simulation system uses 3D simulation technology to truly reproduce the real operation scene of subway. The system sets up two scenes: station and line:

In the station scene, the players can choose the number and placement of equipment independently, and draw the passenger flow line according to the layout of equipment; the system simulates the operation according to the layout of equipment and passenger flow line, and outputs a series of operational indicators such as cost, equipment utilization rate and flow line length;

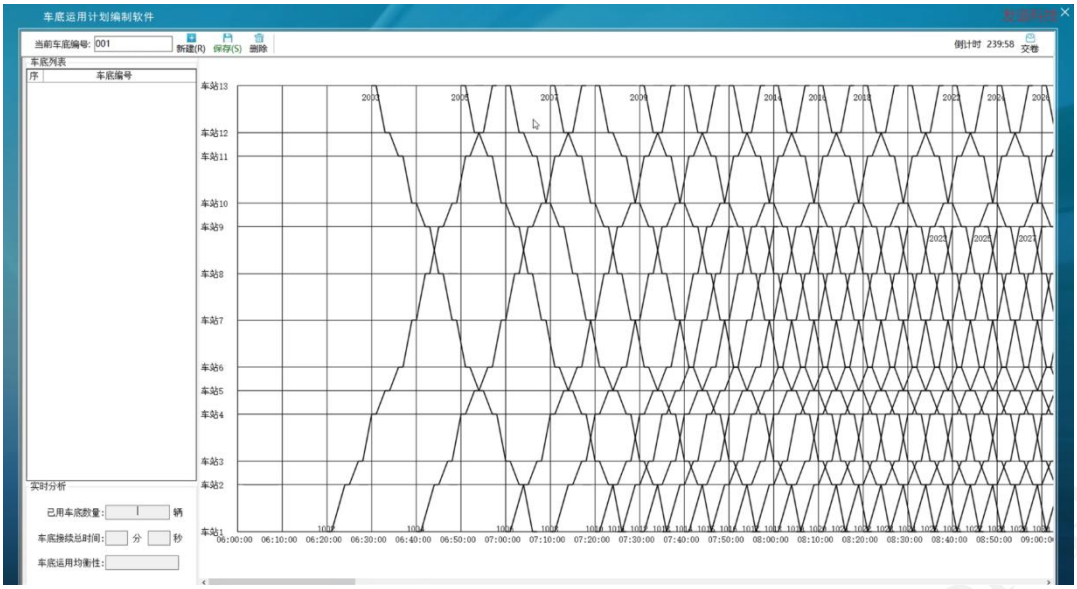


Under the line field road scene, the player can design the operation scheme and draw the operation map according to the OD data. The system can simulate the passenger flow according to the drawn operation map, and output a series of indicators such as operation cost, full load rate, comfort and passenger waiting time.



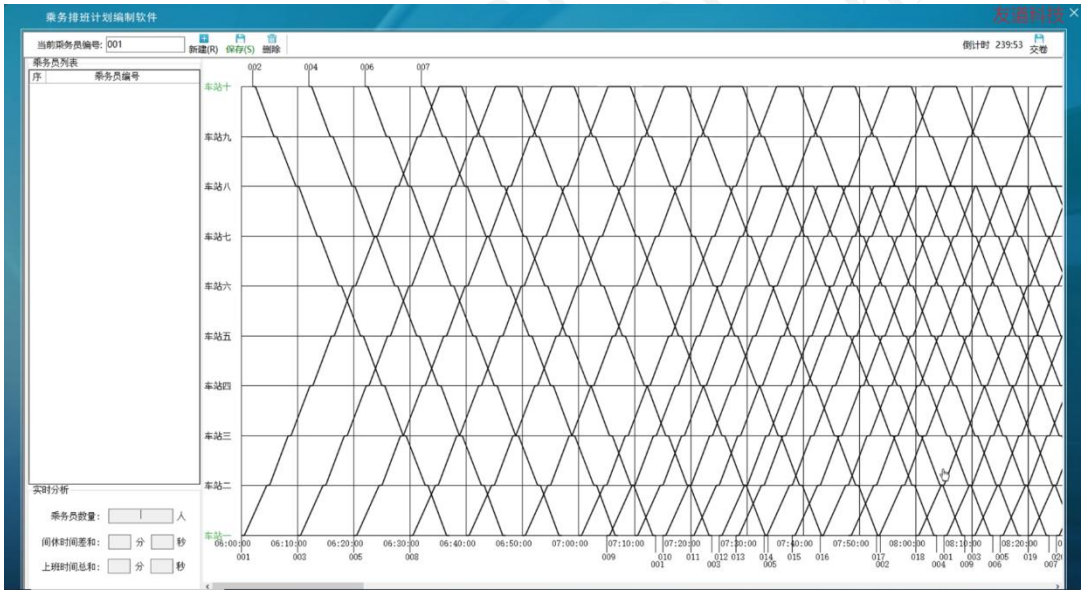
3. Urban rail transit car bottom application planning system The urban rail transit car bottom application planning system is mainly used to assess students' ability to compile the car bottom application plan. The system has five functional modules: management connection, question selection, car bottom application planning,

real-time analysis and paper submission.



4. Urban rail transit service planning system

The urban rail transit service plan preparation system is mainly used to assess students' ability to prepare service plans. The system has five functional modules: management connection, question selection, service schedule plan preparation, real-time analysis and paper submission.



7.3 Proposed site and workstation layout

The competition workstation area must be no less than 6 square meters, marked with the workstation number, and equipped with a set of competition technology platforms with the corresponding modules; the distance between workstations should be at least 1m to ensure that participating teams do not interfere with each other. The competition workstation includes both an exchange area and an observation area, ensuring that these areas and passages do not interfere with the teams.

Each station in the competition area is provided with a 220V (3A) single-phase AC power supply with independent control and leakage protection device, with necessary safety protection measures. In order to ensure the smooth progress of the competition, the computer in the competition area must be equipped with an uninterruptible power supply system.

7.4 Materials and equipment prohibited from use in skill areas

Any materials and equipment carried by the participants shall be declared (produced) to the experts, who may prohibit the use of any items that are irrelevant to the performance of the task or may give an unfair advantage to the competitors.

8. Skill-specific rules

Rules specific to the skill must not conflict with or take precedence over the competition rules. They will provide detailed and clear instructions on various aspects that vary by the skill competition. These include, but are not limited to, personal computing devices, data storage devices, internet access, work procedures, and document management and distribution.

Topics / tasks	Rules for skills
Technology used: Personal laptop, tablet and mobile phone	1. Experts and interpreters may use personal laptops, tablets and mobile phones. 2. Participants are not allowed to bring personal laptops, tablets or mobile phones into the test site.
Technology used: Personal camera	1. Experts and interpreters may use personal photography and video equipment in the examination room only after the completion of the test item or with the consent of the chief expert.
Evaluation of test items	For each workstation (module), the chief expert assigns a supervisor with the highest professional level in that field. During the participants 'completion of the test projects, this supervisor evaluates whether the project points have been completed or not, and these evaluations can only be conducted during the participants' task completion. The designated supervisor is fully responsible for the fairness of the participant's evaluation. 2. If the participants and experts are from the same organization at the workstation, the expert can be replaced once during the module duration.
Make 30% changes in the test project	1. During the introduction of the 30 per cent change, the expert must perform the following: 2. Equipment and software (all modules) provided by the sponsor of the competition: -Update the assembly drawing (or photo) of the installation; -Update the device schematic; -Update the task point description provided by the competition sponsor regarding the software and hardware features of the equipment.
The participants had technical problems during the task	1. If technical problems occur during the implementation of the test project (not due to the fault of the participant), the participant will be given additional time equal to the time from the discovery of the defect to the complete elimination of the defect. 2. If a technical problem is found to be the fault of the participant, the participant will not be given additional time.