CONSTRUCTION AND BUILDING TECHNOLOGY

Bricklaying

Technical Description

 TD20 v8.0 WSC2021

worldskills

WorldSkills International, by a resolution of the Competitions Committee and in accordance with the Constitution, the Standing Orders, and the Competition Rules, has adopted the following minimum requirements for this skill for the WorldSkills Competition.

The Technical Description consists of the following:

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Stefan Praschl
Board member – Competitions

Michael Fung
Board member – Competitions

1 Introduction

1.1 Name and description of the skill competition

1.1.1 The name of the skill competition is

Bricklaying

1.1.2 Description of the associated work role(s) or occupation(s).

A bricklayer generally works on commercial and residential projects. They are responsible for building or repairing associated structures in accordance with the construction plans. There is a direct relationship between the nature and quality of the product required and the payment made by the customer. Therefore, the bricklayer has a continuing responsibility to work professionally in order to meet the requirements of the customer and thus maintain and grow the business. This includes working harmoniously with other trades in order to optimize efficiency and minimize mistakes.

Bricklaying is closely associated with other parts of the construction industry, and with the many products that support it, normally for commercial purposes.

The scale of work can vary from small projects to major projects. The bricklayer works internally and externally and in all weather conditions. He or she will interpret construction drawings, perform setting out and measurement, and construct to a high standard finish.

Work organization and self-management, communication and interpersonal skills, problem solving, innovation, and creativity, working accurately are the universal attributes of the outstanding bricklayer. Whether the bricklayer is working alone or in a team the individual takes on a high level of personal responsibility and autonomy.

From working safely and tidily with resilience and endurance through to exceptional planning and scheduling, concentration, precision, accuracy, and attention to detail to achieve an excellent finish every step in the process matters and mistakes are largely irreversible and very costly.

With the international mobility of people, the bricklayer faces rapidly expanding opportunities and challenges. For the talented bricklayer there are many commercial and international opportunities; however, these carry with them the need to understand and work with diverse cultures and trends. The diversity of skills associated with bricklaying is therefore likely to expand.

1.1.3 Number of Competitors per team

Bricklaying is a single Competitor skill competition.

1.1.4 Age limit of Competitors

The Competitors must not be older than 22 years in the year of the Competition.

1.2 The relevance and significance of this document

This document contains information about the standards required to compete in this skill competition, and the assessment principles, methods and procedures that govern the competition.

Every Expert and Competitor must know and understand this Technical Description.

In the event of any conflict within the different languages of the Technical Descriptions, the English version takes precedence.

1.3 Associated documents

Since this Technical Description contains only skill-specific information it must be used in association with the following:

- WSI – Code of Ethics and Conduct
- WSI – Competition Rules
- WSI – WorldSkills Occupational Standards framework
- WSI – WorldSkills Assessment Strategy
- WSI online resources as indicated in this document
- WorldSkills Health, Safety, and Environment Policy and Regulations.

2 The WorldSkills Occupational Standards (WSOS)

2.1 General notes on the WSOS

The WSOS specifies the knowledge, understanding, and specific skills that underpin international best practice in technical and vocational performance. It should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business (www.worldskills.org/WSOS).

The skill competition is intended to reflect international best practice as described by the WSOS, and to the extent that it is able to. The Standard is therefore a guide to the required training and preparation for the skill competition.

In the skill competition the assessment of knowledge and understanding will take place through the assessment of performance. There will only be separate tests of knowledge and understanding where there is an overwhelming reason for these.

The Standard is divided into distinct sections with headings and reference numbers added.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Standards. This is often referred to as the "weighting". The sum of all the percentage marks is 100. The weightings determine the distribution of marks within the Marking Scheme.

Through the Test Project, the Marking Scheme will assess only those skills that are set out in the Standards Specification. They will reflect the Standards as comprehensively as possible within the constraints of the skill competition.

The Marking Scheme will follow the allocation of marks within the Standards to the extent practically possible. A variation of up to five percent is allowed, provided that this does not distort the weightings assigned by the Standards.

2.2 WorldSkills Occupational Standards

Section		Relative importance (%)
1	**Work organization and management**	**15**

The individual needs to know and understand:

- The importance of establishing and maintaining customer confidence
- The roles and requirements of architects and related trades
- The value of building and maintaining productive working relationships
- Health and safety legislation, obligations, and documentation
- The situations when personal protective equipment must be used
- The purposes, uses, care, maintenance, and storage of all tools and equipment together with their safety implications
- The purposes, uses, care, and storage of materials
- Sustainability measures applying to the use of "green" materials and recycling
- The ways in which working practices can minimize wastage and help to manage costs
- The principles of workflow and measurement
- The significance of planning, accuracy, checking, and attention to detail in all working practices

The individual shall be able to:

- Interpret customer requirements and manage customer expectations
- Interpret customer requirements in order to meet/improve their design and budgetary requirements
- Interpret the needs of architects and related trades
- Contribute own ideas and demonstrate an openness to innovation and change
- Follow health, safety, and environment standards, rules, and regulations
- Select and use the appropriate personal protective equipment including safety footwear, ear, and eye protection
- Select, use, clean, maintain, and store all tools and equipment safely
- Select, use, and store all materials safely
- Plan and maintain the work area to maximize efficiency
- Measure accurately
- Work efficiently and check progress and outcomes regularly
- Establish and maintain high quality standards and working processes
- Identify problems promptly and manage their resolution

Section		Relative importance (%)
2	**Interpretation of drawings**	**10**

The individual needs to know and understand:

- Trends in the industry including new materials and construction methods
- The essential information that must be included in construction drawings
- The importance of checking for missing information or errors, anticipating, and resolving problems in advance of the 'setting out' process and construction
- The role and use of geometry in construction processes
- Mathematical processes and problem solving
- The common types of problems that can occur within a work process
- Diagnostic approaches to problem solving
- Methods of costing and pricing material, equipment, and work processes

The individual shall be able to:

- Accurately interpret all plans, elevations, sections and enlarged details
- Identify horizontal and vertical key dimensions and all angles
- Identify curved work and mortar joint finishes
- Interpret all project features and their required construction methods
- Establish any features that need special equipment or templates and source these
- Recognize specified bonding patterns and obey bonding rules during construction
- Identify drawing errors or items that require clarification
- Determine and check quantities of materials required to build specified projects
- Measure and calculate accurately
- Produce cost and time estimates

3	**Setting out and measurement**	**20**

The individual needs to know and understand:

- The importance of thinking "top down" to ensure all features can be set out at the start of a project
- The implications for the business/organization of not setting out correctly
- The templates/building aids which may be helpful for construction
- Calculations to assist in measuring and checking the project
- Geometrical techniques to assist with the project

Section		Relative importance (%)
	The individual shall be able to: • Visualize and think through projects, identifying potential challenges early and taking the necessary preventative action • Set out the locations, starting points and lines of projects according to plans and specifications • Set out highly technical designs including brick-on-end, brick-on-edge, raked/inclined, curved projecting, recessing brickwork, archways, corbelling, decorative bonding, and battered walling • Accurately interpret the dimensions from drawings and ensure the design is set out within a given tolerance • Check all horizontal and vertical angles • Lay first courses of bricks to check all angles, curves and dimensions are correct • Produce any templates/building aids that may be helpful when constructing • Set out datum points of reference for projects	
4	**Construction**	**40**
	The individual needs to know and understand: • The impact of health, safety, and environment requirements on projects • The application of bed and cross joints to bricks • The precise cutting and laying of bricks to form ornate features and details • The use of hand or machine cutting techniques for different materials • Positioning and laying of bricks in correct positions	
	The individual shall be able to: • Construct projects in accordance with drawings provided • Construct template or arch supports to meet the design requirements • Select bricks which are true to shape and angle and reject bricks which are chipped • Construct brickwork, maintaining accuracy in dimension to within a given tolerance • Check dimensions regularly and correct where necessary • Maintain accuracy of levels to within given tolerances • Transfer levels accurately • Ensure top courses are flat and smooth • Check the undersides of projecting brickwork are level • Maintain accuracy in plumb to within given tolerances • Check the quality of materials • Maintain accuracy of horizontal, vertical, or diagonal alignments to within given tolerances • Check alignments regularly to ensure all surfaces are flat • Maintain accuracy in angles to within given standard tolerances • Check angles regularly and correct where necessary • Render small components of brickwork to smooth and consistent finishes	

Section		Relative importance (%)
	• Construct basic paving, ensuring surfaces are flat and within given tolerances	
5	**Joint finishing and presentation**	**15**
	The individual needs to know and understand: • The need for all work to be presented to meet customer and related trades needs and expectations • The importance of joint finishing in line with the specifications provided • Mortar setting times and absorbency rates of materials • Presentation including the brushing and cleaning of brickwork plus the tidying and cleaning of the work area • The different techniques of applying different joint finishes	
	The individual shall be able to: • Accurately fulfil the interpretation of drawings • Produce brick cuts which are straight and free of chips • Apply joint finishes: raked, round ironed, flushed, and recessed with all joints full, no holes, and smooth finishes • Produce straight lines which provide sharp edges and crisp appearance • Clean brickwork to remove any trowel marks, smudges, and debris from surfaces • Leave work areas in a suitable condition for inspection and subsequent work • Report positive and negative variances in work processes and results, together with their implications • Organize any waste material so that it can be disposed of or recycled efficiently	
	Total	**100**

3 The Assessment Strategy and Specification

3.1 General guidance

Assessment is governed by the WorldSkills Assessment Strategy. The Strategy establishes the principles and techniques to which WorldSkills assessment and marking must conform.

Expert assessment practice lies at the heart of the WorldSkills Competition. For this reason, it is the subject of continuing professional development and scrutiny. The growth of expertise in assessment will inform the future use and direction of the main assessment instruments used by the WorldSkills Competition: the Marking Scheme, Test Project, and Competition Information System (CIS).

Assessment at the WorldSkills Competition falls into two broad types: measurement and judgement. For both types of assessment, the use of explicit benchmarks against which to assess each Aspect is essential to guarantee quality.

The Marking Scheme must follow the weightings within the Standards. The Test Project is the assessment vehicle for the skill competition, and therefore also follows the Standards. The CIS enables the timely and accurate recording of marks; its capacity for scrutiny, support, and feedback is continuously expanding.

The Marking Scheme, in outline, will lead the process of Test Project design. After this, the Marking Scheme and Test Project will be designed, developed, and verified through an iterative process, to ensure that both together optimize their relationship with the Standards and the Assessment Strategy. They will be agreed by the Experts and submitted to WSI for approval together, in order to demonstrate their quality and conformity with the Standards.

Prior to submission for approval to WSI, the Marking Scheme and Test Project will liaise with the WSI Skill Advisors for quality assurance and to benefit from the capabilities of the CIS.

4 The Marking Scheme

4.1 General guidance

This section describes the role and place of the Marking Scheme, how the Experts will assess Competitors' work as demonstrated through the Test Project, and the procedures and requirements for marking.

The Marking Scheme is the pivotal instrument of the WorldSkills Competition, in that it ties assessment to the standard that represents each skill competition, which itself represents a global occupation. It is designed to allocate marks for each assessed aspect of performance in accordance with the weightings in the Standards.

By reflecting the weightings in the Standards, the Marking Scheme establishes the parameters for the design of the Test Project. Depending on the nature of the skill competition and its assessment needs, it may initially be appropriate to develop the Marking Scheme in more detail as a guide for Test Project design. Alternatively, initial Test Project design can be based on the outline Marking Scheme. From this point onwards the Marking Scheme and Test Project should be developed together.

Section 2.1 above indicates the extent to which the Marking Scheme and Test Project may diverge from the weightings given in the Standards, if there is no practicable alternative.

For integrity and fairness, the Marking Scheme and Test Project are increasingly designed and developed by one or more independent people with relevant expertise. In these instances, the Marking Scheme and Test Project are unseen by Experts until immediately before the start of the skill competition, or competition module. Where the detailed and final Marking Scheme and Test Project are designed by Experts, they must be approved by the whole Expert group prior to submission for independent validation and quality assurance. Please see the Rules for further details.

Experts and Independent Assessors are required to submit their Marking Schemes and Test Projects for review, verification, and validation well in advance of completion. They are also expected to work with their Skill Advisor, reviewers, and verifiers, throughout the design and development process, for quality assurance and in order to take full advantage of the CIS's features.

In all cases a draft Marking Scheme must be entered into the CIS at least eight weeks prior to the Competition. Skill Advisors actively facilitate this process.

4.2 Assessment Criteria

The main headings of the Marking Scheme are the Assessment Criteria. These headings are derived before, or in conjunction with, the Test Project. In some skill competitions the Assessment Criteria may be similar to the section headings in the Standards; in others they may be different. There will normally be between five and nine Assessment Criteria. Whether or not the headings match, the Marking Scheme as a whole must reflect the weightings in the Standards.

Assessment Criteria are created by the person or people developing the Marking Scheme, who are free to define the Criteria that they consider most suited to the assessment and marking of the Test Project. Each Assessment Criterion is defined by a letter (A-I). *The Assessment Criteria, the allocation of marks, and the assessment methods, should not be set out within this Technical Description. This is because the Criteria, allocation of marks, and assessment methods all depend on the nature of the Marking Scheme and Test Project, which is decided after this Technical Description is published.*

The Mark Summary Form generated by the CIS will comprise a list of the Assessment Criteria and Sub Criteria.

The marks allocated to each Criterion will be calculated by the CIS. These will be the cumulative sum of marks given to each Aspect within that Assessment Criterion.

4.3 Sub Criteria

Each Assessment Criterion is divided into one or more Sub Criteria. Each Sub Criterion becomes the heading for a WorldSkills marking form. Each marking form (Sub Criterion) contains Aspects to be assessed and marked by measurement or judgement, or both measurement and judgement.

Each marking form (Sub Criterion) specifies both the day on which it will be marked, and the identity of the marking team.

4.4 Aspects

Each Aspect defines, in detail, a single item to be assessed and marked, together with the marks, and detailed descriptors or instructions as a guide to marking. Each Aspect is assessed either by measurement or by judgement.

The marking form lists, in detail, every Aspect to be marked together with the mark allocated to it. The sum of the marks allocated to each Aspect must fall within the range of marks specified for that section of the Standards. This will be displayed in the Mark Allocation Table of the CIS, in the following format, when the Marking Scheme is reviewed from C-8 weeks. (Section 4.1 refers.)

		CRITERIA								TOTAL MARKS PER SECTION	WSSS MARKS PER SECTION	VARIANCE
		A	B	C	D	E	F	G	H			
STANDARDS SPECIFICATION SECTION	1	5.00								5.00	5.00	0.00
	2		2.00					7.50		9.50	10.00	0.50
	3								11.00	11.00	10.00	1.00
	4			5.00						5.00	5.00	0.00
	5				10.00	10.00	10.00			30.00	30.00	0.00
	6		8.00	5.00				2.50	9.00	24.50	25.00	0.50
	7			10.00				5.00		15.00	15.00	0.00
TOTAL MARKS		5.00	10.00	20.00	10.00	10.00	10.00	15.00	20.00	100.00	100.00	2.00

4.5 Assessment and marking

There is to be one marking team for each Sub Criterion, whether it is assessed and marked by judgement, measurement, or both. The same marking team must assess and mark all Competitors. Where this is impracticable (for example where an action must be done by every Competitor simultaneously, and must be observed doing so), a second tier of assessment and marking will be put in place, with the approval of the Competitions Committee Management Team.. The marking teams must be organized to ensure that there is no compatriot marking in any circumstances. (Section 4.6 refers.)

4.6 Assessment and marking using judgement

Judgement uses a scale of 0-3. To apply the scale with rigour and consistency, judgement must be conducted using:

- benchmarks (criteria) for detailed guidance for each Aspect (in words, images, artefacts or separate guidance notes)
- the 0-3 scale to indicate:
  - 0: performance below industry standard
  - 1: performance meets industry standard
  - 2: performance meets and, in specific respects, exceeds industry standard
  - 3: performance wholly exceeds industry standard and is judged as excellent

Three Experts will judge each Aspect, normally simultaneously, and record their scores. A fourth Expert coordinates and supervises the scoring, and checks their validity. They also act as a judge when required to prevent compatriot marking.

4.7 Assessment and marking using measurement

Normally three Experts will be used to assess each aspect, with a fourth Expert supervising. In some circumstances the team may organize itself as two pairs, for dual marking. Unless otherwise stated, only the maximum mark or zero will be awarded. Where they are used, the benchmarks for awarding partial marks will be clearly defined within the Aspect. To avoid errors in calculation or transmission, the CIS provides a large number of automated calculation options, the use of which is mandated.

4.8 The use of measurement and judgement

Decisions regarding the choice of criteria and assessment methods will be made during the design of the competition through the Marking Scheme and Test Project.

4.9 Skill assessment strategy

WorldSkills is committed to continuous improvement. This particularly applies to assessment. The SMT is expected to learn from past and alternative practice and build on the validity and quality of assessment and marking.

The skill assessment criteria are clear concise aspect specifications which explain exactly how and why a particular mark is awarded. The Independent Test Project Designer is responsible for developing the Marking Scheme to be applied by the panel of Experts. An accompanying set of marking plans also needs to be provided to assist the marking teams with their assessment.

Experts must use the marking tools and equipment provided by the Competition Organizer (except the Competitors measuring equipment) to assess the Test Projects. Competitors are given time to check their tools and equipment against these tools during familiarization time.

Straight edges used by the Experts to mark specific marking points must be a straight edge that is the same thickness as a standard level.

Following is an example of aspects which may be assessed:

Dimensions, level, plumb, alignment, and angles

- Measured at reference points and according to the Marking Scheme

Details

- Can include plumb, level, dimension, alignment, and angle checks of detailed components of the Test Project to ensure accuracy is maintained within given tolerances
- Number of bricks correct;
- Cuts;
- Consistency;
- Radius of curves;
- Projections

Jointing

- Flush and recessed joints – all joints full, no holes, smooth finish;
- Render finish – clean and neat, no holes, smooth finish;
- A sample panel of the jointing finishes (made and approved by the Experts) are on display for Competitors and marking teams to refer to.

Finish

- Brick cuts – straight, consistent and no chipping
- Drawing interpretation;
- Cleanliness and finished appearance

Deductions

- A proportion of the available mark is deducted according to the amount of error. The amount of the deduction varies depending on the aspect and is identified on the Measurement Marking Form.

In regard to level, plumb, alignment angles, and dimension, the error deductions are determined by the Independent Test Project Designer as part of the Marking Scheme development. As a reference, the deductions used at the previous international competition are:

- For aspects that are of 1.0 mark value there is a 0.1 deduction per 1 mm of error.
- For aspects that are of 0.5 mark value there is a 0.1 deduction per 1 mm of error.

4.10 Skill assessment procedures

Assessment and marking are an intense process that depends upon skilful leadership, management, and scrutiny.

The Experts are divided into marking groups to deal with each section of the marking criteria.

The marking of modules will start when all Competitors have finished their module.

Experts do not receive the marking information for their group until the Competitors have completed the module that is being assessed.

- Horizontal dimensions are checked level with the top of the first course;
- Plumb and level are checked 10 mm back from the corner;
- The marking of alignment must include checks across the full face of the module.
- When checking alignment the Competitor's levels must be used. For any checks that are longer than the standard levels, a straight edge which is the same thickness as a standard level must be used.

The Experts agree that a majority vote is needed to:

- Change Marking Scheme (within limits specified in the Technical Description);
- Change Competition sequence or content;
- Agree on a solution for disputes concerning points awarded etc.

The Marking Scheme is developed by the Independent Test Project Designer during Test Project development. The assessment information is not provided to the marking group until the all Competitors have completed the work that is assessed.

The Skill Management Team selects the Experts for the judgement group. The Experts selected for this assessment group need to be experts from industry and possess the suitable industry and competition experience to fulfil the role.

Four Experts are used in the Judgement Marking Group. Three Experts will conduct the judging, but the reserve is used to score to resolve a score dispute or to mark any compatriot Competitors linked to the core Judgement Marking Group.

All Judgement Marking is carried out by Experts from a distance of one metre away from the Test Project wherever possible.

A module is not deemed complete until all aspects are completed by the competitor this will include all details and joint finishing has been attempted. The Chief Expert may stop a competitor from progressing on to the next module until this is finished appropriately.

5 The Test Project

5.1 General notes

Sections 3 and 4 govern the development of the Test Project. These notes are supplementary.

Whether it is a single entity, or a series of stand-alone or connected modules, the Test Project will enable the assessment of the applied knowledge, skills, and behaviours set out in each section of the WSOS.

The purpose of the Test Project is to provide full, balanced, and authentic opportunities for assessment and marking across the Standards, in conjunction with the Marking Scheme. The relationship between the Test Project, Marking Scheme, and Standards will be a key indicator of quality, as will be its relationship with actual work performance.

The Test Project will not cover areas outside the Standards, or affect the balance of marks within the Standards other than in the circumstances indicated by Section 2. This Technical Description will note any issues that affect the Test Project's capacity to support the full range of assessment relative to the Standards. Section 2.1 refers.

The Test Project will enable knowledge and understanding to be assessed solely through their applications within practical work. The Test Project will not assess knowledge of WorldSkills rules and regulations.

Most Test Projects (and Marking Schemes) are now designed and developed independently of the Experts. They are designed and developed either by the Skill Competition Manager, or an Independent Test Project Developer, normally from C-12 months. They are subject to independent review, verification, and validation. (Section 4.1 refers.)

The information provided below will be subject to what is known at the time of completing this Technical Description, and the requirement for confidentiality.

Please refer to the current version of the Competition Rules for further details.

5.2 Format/structure of the Test Project

The Test Project is a series of maximum five (5) modules.

5.3 Test Project design requirements

The Test Project should not exceed 600 bricks and the design can include render, paving, blockwork, arch set out, and advanced detail.

The final number of bricks should take into consideration the difficulty of the project.

The design of a Test Project module to be built by a Competitor must not exceed 1.65 m as a maximum height. The Competition Organizer is to make step ladders available that are allowable under the WorldSkills Health, Safety, and Environment policy and regulations. If a Competitor is using the ladders in an unsafe manner they are stopped and given another induction.

Brick cutting is limited to a maximum of 20% of the total number of bricks in reference to the cuts that are not 90°. It can be increased to 30% on small modules.

Approximate percentages of cutting must be presented with the Test Project information.

It is preferable that the first module take no longer than nine (9) hours. The final module should commence on C3 to allow for progressive marking of the previous modules.

The independent design is to be designed using the standard product sizes of the Competition Organizer.

The design is to be drawn at 1:10 scale and preferably in colour.

There needs to be sufficient space between modules for Experts to carry out progressive marking without disrupting the Competitors.

Clear, understandable jointing plans must be provided to Competitors identifying the exact joint types and their locations with the working drawings.

5.4 Test Project development

The Test Project MUST be submitted using the templates provided by WorldSkills International (www.worldskills.org/expertcentre). Use the Word template for text documents and DWG template for drawings.

5.4.1 Who develops the Test Project or modules

The Test Project/modules are developed by an Independent Test Project Designer in collaboration with the Skill Competition Manager.

5.4.2 When is the Test Project developed

The Test Project/modules are developed according to the following timeline:

Time	Activity
Prior to the Competition	The Test Project/modules and Marking Scheme are developed by the Independent test project Designer.
At the Competition on C-2	The Test Project/modules are presented to the Experts without any technical information.
At the Competition on C1	The full Test Project/modules are presented to Competitors.

5.5 Test Project initial review and verification

The purpose of a Test Project is to create a challenge for Competitors which authentically represents working life for an outstanding practitioner in an identified occupation. By doing this, the Test Project will apply the Marking Scheme and fully represent the WSOS. In this way it is unique in its context, purpose, activities, and expectations,

To support Test Project design and development, a rigorous quality assurance and design process is in place (Competition Rules sections 10.6-10.7 refer.) Once approved by WorldSkills, the Independent Test Project Designer is expected to identify one or more independent, expert, and trusted individuals initially to review the Designer's ideas and plans, and subsequently to verify the Test Project, prior to validation.

A Skill Advisor will ensure and coordinate this arrangement, to guarantee the timeliness and thoroughness of both initial review, and verification, based on the risk analysis that underpins Section 10.7 of the Competition Rules.

5.6 Test Project validation

The Skill Competition Manager coordinates the validation and will ensure that the Test Project/modules can be completed within the material, equipment, knowledge, and time constraints of Competitors.

5.7 Test Project selection

The Test Project/modules are selected by the Independent Test Project Designer in collaboration with the Skill Competition Manager.

5.8 Test Project circulation

The Test Project is circulated via the website as follows:

The Test Project/modules are not circulated prior to the Competition. The Test Project/modules are presented to Experts and Competitors on C-2.

The presentation on C-2 will give Experts and Competitors the opportunity to see pictures of the Test Project, but this will not include technical information. The working drawings are provided to Competitors on C1. This includes any minor updates taking into consideration the infrastructure.

5.9 Test Project coordination (preparation for Competition)

Coordination of the Test Project/modules is undertaken by the Skill Competition Manager.

5.10 Test Project change

There is no 30% change required to be made to the Test Project/modules at the Competition. Exceptions are amendments to technical errors in the Test Project documents and to infrastructure limitations.

A CAD professional and/or the Independent Test Project Designer makes any of the agreed minor changes (if required) to the plans.

5.11 Material or manufacturer specifications

Specific material and/or manufacturer specifications required to allow the Competitor to complete the Test Project will be supplied by the Competition Organizer and are available from www.worldskills.org/infrastructure located in the Expert Centre. However, note that in some cases details of specific materials and/or manufacturer specifications may remain secret and will not be released prior to the Competition. These such items may include those for fault finding modules or modules not circulated.

The Competition Organizer will upload photos and specifications of the brick, block, and mortar in the Infrastructure List. Samples will not be sent.

Specifications and images of the Competition Organizer's brick saws must also be uploaded in the Infrastructure List at least three (3) months prior to the Competition.

Competitors are notified of any Competition Organizer requirements with regard to safety and/or equipment and materials six (6) months prior to the Competition.

6 Skill management and communication

6.1 Discussion Forum

Prior to the Competition, all discussion, communication, collaboration, and decision making regarding the skill competition must take place on the skill specific Discussion Forum (http://forums.worldskills.org). Skill related decisions and communication are only valid if they take place on the forum. The Chief Expert (or an Expert nominated by the Chief Expert) will be the moderator for this Forum. Refer to Competition Rules for the timeline of communication and competition development requirements.

6.2 Competitor information

All information for registered Competitors is available from the Competitor Centre (www.worldskills.org/competitorcentre).

This information includes:

- Competition Rules
- Technical Descriptions
- Mark Summary Form (where applicable)
- Test Projects (where applicable)
- Infrastructure List
- WorldSkills Health, Safety, and Environment Policy and Regulations
- Other Competition-related information

6.3 Test Projects [and Marking Schemes]

Circulated Test Projects will be available from www.worldskills.org/testprojects and the Competitor Centre (www.worldskills.org/competitorcentre).

6.4 Day-to-day management

The day-to-day management of the skill during the Competition is defined in the Skill Management Plan that is created by the Skill Management Team led by the Skill Competition Manager. The Skill Management Team comprises the Skill Competition Manager, Chief Expert, and Deputy Chief Expert. The Skill Management Plan is progressively developed in the six months prior to the Competition and finalized at the Competition by agreement of the Experts. The Skill Management Plan can be viewed in the Expert Centre (www.worldskills.org/expertcentre).

6.5 General best practice procedures

General best practice procedures clearly delineate the difference between what is a best practice procedure and skill-specific rules (section 9). General best practice procedures are those where Experts and Competitors CANNOT be held accountable as a breach to the Competition Rules or skill-specific rules which would have a penalty applied as part of the Issue and Dispute Resolution procedure including the Code of Ethics and Conduct Penalty System. In some cases, general best practice procedures for Competitors may be reflected in the Marking Scheme.

Topic/task	Best practice procedure
Use of technology – music devices	• Competitors are allowed to use devices to listen to music during the competition time, but this does not include devices with communication capabilities. This equipment is included in the daily toolbox checks.
Drawings and specifications	• All drawings and competition information are the responsibility of the Competitor, after they have been handed out by the Chief Expert.
Equipment failure	• Any equipment failure must be brought to the attention of the Chief Expert immediately. The reallocation of time lost is at the discretion of the Chief Expert and the Experts responsible for timekeeping.
Assessment	• The Competitor's measuring tape and square are used during assessment. It is the Competitor's responsibility to provide their own measuring tools for use during assessment. If the Competitor fails to leave the equipment for assessment, the Chief Expert's or Expert's marking set is used.

7 Skill-specific safety requirements

Refer to WorldSkills Health, Safety, and Environment Policy and Regulations for Host country or region regulations.

Task	Safety glasses with side protection	Dust mask	Cut protection gloves (no broken threads should be exposed)	Safety shoes with protective cap	Sturdy shoes with closed toe and heel	Hearing protection	Apron
General PPE for safe areas					√		
Competitor PPE during competition	√			√			
During cutting on saws	√	√	optional	√		√	optional
During sweeping up	√	√		√		√	
Hand cutting	√	√	√	√		√	optional

- All safety breaches may result in either a warning being issued to a Competitor or another workshop safety induction, this is carried out as a time penalty during the Competitor's competition working time. This is dependent on the severity of the breach and is the decision of the Skill Management Team.
- The Competition Organizers must supply low decibel saw blades, with a minimum cutting depth of 150 mm.
- All Competitors must be fully briefed about safe working practices and safe use of the saw to the satisfaction of the ESR for Health, Safety, and the Environment prior to the start of the competition.
- Competitors are expected to work safely and maintain a safe working area during competition; they are also responsible for the cleaning of the area near their projects and their designated saw area.
- It is the responsibility of all Competitors to remove mortar droppings away from the base of the Test Projects.
- After the Competitors have cleared the mortar droppings Experts and workshop assistants can assist the Competitors to clean their whole work area. Experts and assistants must not come in contact with the Test Projects during the cleaning process.

8 Materials and equipment

8.1 Infrastructure List

The Infrastructure List details all equipment, materials, and facilities provided by the Competition Organizer.

The Infrastructure List is available at www.worldskills.org/infrastructure.

The Infrastructure List specifies the items and quantities requested by the Skill Management Team for the next Competition. The Competition Organizer will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items. Note that in some cases details of specific materials and/or manufacturer specifications may remain secret and will not be released prior to the Competition. These such items may include those for fault finding modules or modules not circulated.

At each Competition, the Skill Management Team must review and update the Infrastructure List in preparation for the next Competition. The Skill Competition Manager must advise the Director of Skills Competitions of any increases in space and/or equipment.

At each Competition, the Technical Observer must audit the Infrastructure List that was used at that Competition.

The Infrastructure List does not include items that Competitors and/or Experts are required to bring and items that Competitors are not allowed to bring – they are specified below.

Both block and brick products must be of the highest face quality, as it affects the visual aspects of the projects, impacts on the marking process and it can also significantly affect the amount of waste product.

For C+1 a separate meeting room needs to be made available for discussion of the skill development as competition site deconstruction may be taking place creating noise levels that make discussions very difficult.

8.2 Competitors toolbox

Competitors may bring up to two (2) toolboxes with the total external volume not exceeding 1.25 m^3.

(Volume = Length x Height x Width, or V = L x H x W)

Volume measurement does not include a packing crate, other protective packing material, palette for transportation, wheels, etc.

Toolboxes must remain in the allocated work area for the duration of the Competition.

8.3 Materials, equipment, and tools supplied by Competitors

The following items are allowed to be carried in the toolbox:

Item	Quantity	Photo
Trowel		
Masons hammer		
Mallet		
Lump hammer		
Angle Bevel		
Spirit level		
Pointing trowel		
Cleaning tools		

Item	Quantity	Photo
Marking out string		
Large compass		 
Safety footwear		
Ear and eye protection		 
Rendering tools		  

- The Competitor's measuring tape, level, and square are used during assessment. It is the Competitor's responsibility to provide their own measuring tools for assessment. The accuracy of the tools used is the responsibility of the Competitor. If the Competitor tools have not been made available, the judging tools are used.
- Competitors are allowed to bring digital measuring devices to use during the Competition.
- The only power tools that can be used are those supplied by the Competition Organizer.
- Profiles are permitted but must be assembled during Competition time.
- Water in open containers or buckets can be used for cleaning brickwork and blockwork with chemical free sponges.
- Mortar additives may be used to make mortar more workable (can be liquid or powder; data sheets must be sent to the Competition Organizer for approval).

Templates

- Items that are in general use in the industry are permitted, but any item that is specific to the project will not be allowed.
- 15, 30, 45, 60, 75, and 90 degree set square templates are allowed to be brought into the Competition.
- Half, quarter, and three-quarter brick templates are allowed to be brought into the Competition.
- If project specific templates are being used, they must be made during Competition time.
- For arches or curves the centre should be (if possible) included within the template.
- The accuracy of the tools used is the responsibility of the Competitor.

Competitors are to use the tools supplied by a sponsor.

Competitors are required to supply their own Personal Protective Equipment as specified in section 7 skill-specific safety requirements.

8.4 Materials, equipment, and tools supplied by Experts

Experts are required to supply their own Personal Protective Equipment as specified in section 7 skill-specific safety requirements.

8.5 Materials and equipment prohibited in the skill area

- Competitors are not allowed to bring any chemicals into the competition site (this includes mortar additives);
- The use of brick cleaning fluids or oil is not allowed (that is, chemicals).
- It is explained to all Experts and Competitors that nothing is to come into or out of the workshop unless approved by the Chief Expert or Deputy Chief Expert. This includes any items that are being added or removed from toolboxes.
- Tools using compressed air are not allowed to be used during the competition. This includes spray cans and aerosols.

Power tools and electrical equipment

No power tools and/or electrical equipment are permitted to be used, except for:

- Power tools provided by the Competition Organizer, minimum of one tool per four;
- Battery operated drill – provided by Competition Organizer;
- Battery operated jigsaw – provided by Competition Organizer.

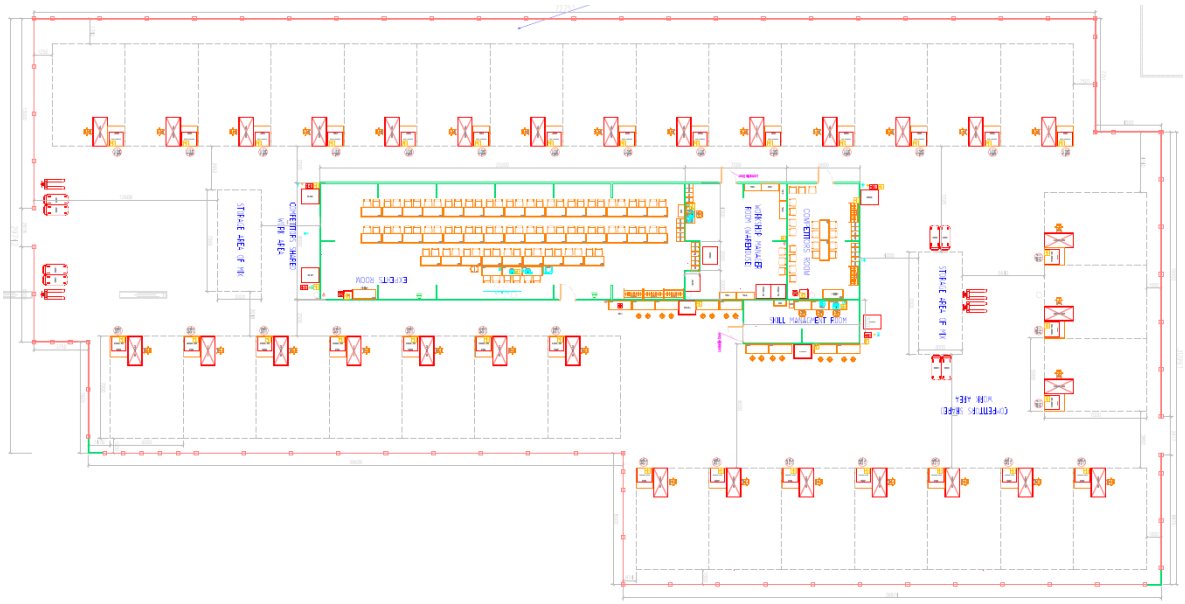
Bond Paper

- A sufficient number of bond paper sheets marked out to bond size for - bricks, blocks, and pavers are to be supplied by the Competition Organizer.

8.6 Proposed workshop and workstation layouts

Workshop layouts from previous competitions are available at www.worldskills.org/sitelayout.

Example workshop layout



It is preferable that the bricklaying competition workshop is not long and narrow as it tends to disadvantage some Competitors, can cause congestions with material supply and also has a negative impact on the layout of briefing and meeting areas.

Each Competitor workstation must have adequate illumination to create the same levels of lighting for every Competitor.

9 Skill-specific rules

Skill-specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from skill competition to skill competition. This includes but is not limited to personal IT equipment, data storage devices, Internet access, procedures and workflow, and documentation management and distribution. Breaches of these rules will be solved according to the Issue and Dispute Resolution procedure including the Code of Ethics and Conduct Penalty System.

Topic/task	Skill-specific rules
Use of technology – USB, memory sticks	• Memory sticks and digital storage devices may be used by Skill Competition Manager, Chief Expert, Deputy Chief Expert, Experts, and Interpreters during the competition.
Use of technology – personal laptops, tablets, and mobile phones	• Competitors are not allowed to bring personal laptops, tablets, or mobile phones into the workshop. If these items are brought into the workshop, then they must be locked in the personal locker and can be removed at lunch time or at the end of each day. • Skill Competition Manager, Chief Expert, Deputy Chief Expert, Experts, and Interpreters are allowed to use personal laptops and tablets in the Expert room only. • Skill Competition Manager, Chief Expert, Deputy Chief Expert, Experts, and Interpreters are allowed to bring mobile phones in the workshop and leave them in their pocket however they are not to be used in the workshop. It is encouraged that making or taking calls is done outside the workshop
Use of technology – personal cameras, and other devices	• Skill Competition Manager, Chief Expert, Deputy Chief Expert, Competitors, Experts, and Interpreters are allowed to use personal photo and video taking devices in the workshop but not in any Competitor areas. • Skill Competition Manager, Chief Expert, Deputy Chief Expert, Experts, and Interpreters are not allowed to use their mobile phones or, photo or video taking devices in close proximity to where assessment is taking place.

Topic/task	Skill-specific rules
Templates, aids, etc.	• Competitors are allowed to use profiles but their assembly and positioning must take place during competition time. • The Competitor toolkit including any profile stabilisation cannot encroach on any floor space outside of the Competitor's allocated area. • Items that are in general use in the industry are permitted, but any item that is specific to the project will not be allowed. • 15, 30, 45, 60, 75, and 90 degree set square templates are allowed to be brought into the competition. • Half, quarter, and three-quarter brick templates are allowed to be brought into the competition. • Competitors are allowed to use project specific templates however they must be made during competition time. • For arches or curves the centre is provided by the Competition Organizer.
Test Project	• Competitors are permitted the use of dummy joints/fake jointing in the competition Test Project. • Only water can be used to clean the brickwork and blockwork.

10 Visitor and media engagement

Following is a list of possible ways to maximize visitor and media engagement:

- Try-a-Skill;
- Display screens;
- Test Project descriptions;
- Enhanced understanding of Competitor activity;
- Competitor profiles;
- Career opportunities;
- Daily reporting of competition status

11 Sustainability

This skill competition will focus on the sustainable practices below:

- Recycling;
- Use of "green" materials;
- Use of completed Test Projects after Competition

12 References for industry consultation

WorldSkills is committed to ensuring that the WorldSkills Occupational Standards fully reflect the dynamism of internationally recognized best practice in industry and business. To do this WorldSkills approaches a number of organizations across the world that can offer feedback on the draft Description of the Associated Role and WorldSkills Occupational Standards on a two-yearly cycle.

In parallel to this, WSI consults three international occupational classifications and databases:

- ISCO-08: (http://www.ilo.org/public/english/bureau/stat/isco/isco08/) ILO 7112
- ESCO: (https://ec.europa.eu/esco/portal/home)
- O*NET OnLine (www.onetonline.org/)

This WSOS (Section 2) appears to relate most closely to *Brickmasons and Stonemasons*:
https://www.onetonline.org/link/summary/47-2021.00,

and to *Bricklayer*:
http://data.europa.eu/esco/occupation/05f321f8-055b-407d-bf19-e0ddabda56b7

Adjacent occupations can also be explored through these links.

The following table indicates which organizations were approached and provided valuable feedback for the Description of the Associated Role and WorldSkills Occupational Standards in place for WorldSkills Shanghai 2021.

Organization	Contact name
Construction Industry Development Board (Malaysia)	Raslim Salleh, General Manager, Skills Competency Development Division