



TECHNICAL DESCRIPTION

Bricklaying



WorldSkills International, by a resolution of the Technical 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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Liam Corcoran
Technical Committee Chair

1. INTRODUCTION

1.1 Name and description of skill

1.1.1 The name of the skill is [Bricklaying](#).

1.1.2 Description of skill

[Bricklayers work on commercial and residential projects where they lay bricks, block stone, glass block or terra cotta to build interior and exterior walls, partitions, fireplaces, chimneys, smokestacks and other structures.](#)

[A bricklayer is trained to do the following jobs:](#)

- [select and prepare mortars](#)
- [build interior/exterior walls and partitions](#)
- [install insulation in masonry walls](#)
- [lay radial brick or stone for industrial and residential chimneys](#)
- [apply firebrick to chimneys and smokestacks](#)
- [apply acid-resistant brick to kilns and tanks](#)
- [create garden walls, footpaths, arches, patios and balconies](#)
- [precision cut stone, brick, block and other dense masonry materials](#)
- [reinforce masonry structures with bolts, tie bars or metal mesh](#)

[To become a successful bricklayer requires endurance, concentration, planning and scheduling, varied hands-on skills, competent bricklaying, an eye for detail, and tidiness.](#)

1.2 Scope of application

1.2.1 Every Expert and Competitor must know this Technical Description.

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

1.3 Associated documents

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

- WSI - Competition Rules
- WSI - Competition Manual
- WSI - Online resources as indicated in this document
- Host Country - Health and Safety regulations

2. COMPETENCY AND SCOPE OF WORK

The Competition is a demonstration and assessment of the competencies associated with this skill. The Test Project consists of practical work only.

2.1 Competency specification

[The competencies that are required include:](#)

- [Measuring and marking out with strings](#)
- [Laying project materials](#)
- [Levelling and plumbing](#)
- [Cutting and finishing bricks](#)

- Building walls of different bonds: using stretcher or header, brick-on-end, brick-on-edge, raking; corbels, decorative bonds sloping or battering walls according to the drawing and using materials indicated in the Infrastructure List.
- Finish to mortar joints
- Cleaning
- Building in openings
- Paving
- Arch supports (Note: If arch supports need to be constructed they must be made by the Competitor at the Competition at a time indicated by the Experts.)
- Rendering
- Templates

2.2 Theoretical knowledge

2.2.1 Theoretical knowledge is required but not tested explicitly.

The following theoretical knowledge is expected:

- Interpretation and execution of drawings, sketches and specifications to ISO standards
- Laying and marking out to 1:1 scale
- Knowledge of design
- Knowledge of materials and processes
- Knowledge of bonding

2.2.2 Knowledge of rules and regulations is not examined.

2.3 Practical work

The Test Project includes the construction of brick walls, or surfaces of facing bricks and blocks of different materials.

For example, decorative brickwork with projections and recesses in all possible bonds, sections of walls with Segmental, Semi-Circular, Triangular, 3 Centre, Flat, Gothic Arches; curved walls, cavity walls as well as rendering to provide a smooth finish by use of sand, lime, cement, and paving with natural or artificial materials.

The skills to be tested in each project will be common to every competing country.

3. THE TEST PROJECT

3.1 Format / structure of the Test Project

The format of the Test Project is modular with a maximum of 4 modules. A module is not deemed complete until all joint finishing has been attempted.

3.2 Test Project design requirements

The Test Project will be modular with a maximum of 4 modules

Test Project and Test Project proposals should be approximate 600 bricks . The final number of bricks should take into consideration the difficulty of the project.

The Test Project should have the following proportion of work types:

- 70% to 85% brickwork
- 10% to 15% blockwork
- 7% to 8% render
- 5% to 7% arch set out or other details
- Design may include up to 10% of paving
- Brick cutting is limited do 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 for each Test Project proposal or change proposal before voting takes place.

All proposals are to be designed using the standard product sizes of the Host Country.

Proposals are to be drawn at 1:10 scale and preferably in colour.

3.3 Test Project development

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

3.3.1 Who develops the Test Project / modules

The Test Project / modules are developed by:

All Experts are encouraged to submit proposals for Test Project/modules.

3.3.2 How and where is the Test Project / modules developed

The proposals for the Test Project/modules are developed **independently**.

3.3.3 When is the Test Project developed

The Test Project is developed:

The proposals for the Test Project/modules are developed **before the previous Competition**. See **timeline below**:

Time	Activity
Before previous Competition	Experts develop proposals for the Test Project. Discussion between Experts and the Chief and Deputy Chief Experts is encouraged via the forum.
At the previous Competition	The Test Project is selected by voting on the eligible proposals.
6 months before the Competition	Competitors are notified of any specific Host Country requirements with regard to safety and/or equipment and materials.
3 months before the Competition	The Test Project is circulated on the WSI website.
At the Competition	The Test Project is has 30% change made by Experts. The Expert that developed the Test Project is not involved in the 30% change.

3.4 Test Project marking scheme

The Test Project Marking scheme must be in accordance with the criteria defined in Section 5.

3.4.1 Development of the marking scheme

It is not compulsory for Test Project proposals to be accompanied by a Marking Scheme, but any expert may submit a marking scheme proposal for the consideration of the panel of experts. The detailed and final marking scheme is developed and agreed by all Experts at the Competition.

3.4.2 Marking schemes should be entered into the CIS as soon as possible after they have been agreed upon.

3.5 Test Project validation

Test Project proposals must be validated and tested through being constructed and timed to prove that it is reasonable for the constraints of the Competition.

3.6 Test Project selection

The Test Project is selected **by vote of Experts at previous Competition**.

3.7 Test Project circulation

The Test Project is circulated on the WorldSkills International website 3 months before the current Competition.

3.8 Test Project coordination (preparation for Competition)

Coordination of the Test Project will be undertaken by the Chief Expert.

3.9 Test Project change at the Competition

The focus of change is on one module - only minor adjustments can be made to the other modules.

All experts bring proposals for the 30% change to the circulated Test Project to the Competition. These proposals are presented and voted on as early as possible during the preparation days.

Due to circumstances relating to the Host Member, such as material and equipment availability and sponsors it is common for the Test Project to have changes made at the Competition to accommodate these circumstances.

A CAD professional makes the agreed 30% change to the plans. The changed plans are given to the Competitors during their familiarisation on C-1.

3.10 Material or manufacturer specifications

The Host Member must send out samples of brick, block and mortar to all participating Members at least 3 months before the Competition.

4. SKILL MANAGEMENT AND COMMUNICATION

4.1 Discussion Forum

Prior to the Competition, all discussion, communication, collaboration and decision making regarding the skill must take place on the skill-specific Discussion Forum (<http://www.worldskills.org/forums>). All 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 moderator for this forum. Refer to Competition Rules for the timeline of communication and competition development requirements.

4.2 Competitor information

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

This information includes:

- Competition Rules
- Technical Descriptions
- Test Projects
- Other Competition-related information

4.3 Test Projects

Circulated Test Projects will be available from [worldskills.org](http://www.worldskills.org) (<http://www.worldskills.org/testprojects>) and the Competitor Centre (<http://www.worldskills.org/competitorcentre>).

4.4 Day-to-day management

The day-to-day management is defined in the Skill Management Plan that is created by the Skill Management Team led by the Chief Expert. The Skill Management Team comprises the Jury President, Chief Expert and Deputy Chief Expert. The Skill Management Plan is progressively developed in the six months prior to the Competition and finalised at the Competition (agreed by

Experts and submitted to the Chair/Vice Chair of the Technical Committee). The Chief Expert is to regularly share updates of the Skill Management Plan via the Forum.

5. **ASSESSMENT**

This section describes how the Experts will assess the Test Project / modules. It also specifies the assessment specifications and procedures and requirements for marking.

5.1 **Assessment criteria**

This section defines the assessment criteria and the number of marks (subjective and objective) awarded. The total number of marks for all assessment criteria must be 100.

Section	Criterion	Marks		
		Subjective (if applicable)	Objective	Total
A	Dimensions		20	20
B	Level		10	10
C	Plumb		20	20
D	Alignment		5	5
E	Angles		5	5
F	Details		20	20
G	Jointing	10		10
H	Finish	10		10
Total =		20	80	100

5.2 **Subjective marking**

Scores are awarded on a scale of 1 to 10.

5.3 **Skill assessment specification**

The skill assessment criteria are clear concise Aspect specifications which explain exactly how and why a particular mark is awarded. The Experts will decide together on the marking criteria, reference points and the dimensional tolerances on the Objective Marking Forms. Marking plans will be formulated to highlight the marking locations and the Experts will decide upon how and when the competitors view them.

Following is an example of Aspects which may be assessed.

Dimensions, level, plumb, alignment and angles

Measured at predetermined reference points

Details

Alignment and angles checked and measured at predetermined reference points

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, all joints full, no holes, smooth finish

A sample panel of the jointing finishes (made and approved by the experts) will be on display.

Finish

Brick cuts – straight, equal, clear of chips
Drawing interpretation
Cleanliness and finished appearance

Deductions

A proportion of marks is deducted for each tolerance increment to the marking Aspect as decided by the Experts. The amount of the deduction varies depending on the Aspect and is itemised on the Objective Marking Form.

In regard to level, plumb, alignment, angles and dimension:

- For aspects that are of 1 Mark value there will be a .1 deduction per 1mm of error.
- For aspects that are of .5 Mark value there will be a .05 deduction per 1mm of error.

5.4 Skill assessment procedures

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

Each module/task/section will be completed on the assigned day so that progressive marking can take place.

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

To ensure transparency, each Competitor is provided the same evaluation sheet as used by the Experts:

- Horizontal dimension will be checked level with the top of the first course.
- Plumb and level will be checked 10 mm back from the face.

Progressive results are to be available each day via a PowerPoint presentation or similar.

The Experts agree that a majority vote is needed to:

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

6. SKILL-SPECIFIC SAFETY REQUIREMENTS

Refer to Host Country Health & Safety documentation for Host Country regulations. There are no skill-specific safety requirements.

7. MATERIALS & EQUIPMENT

7.1 Infrastructure List

The Infrastructure List lists all equipment, materials and facilities provided by the Host Country.

The Infrastructure List is online (<http://www.worldskills.org/infrastructure/>).

The Infrastructure List specifies the items & quantities requested by the Experts for the next Competition. The Host Country will progressively update the Infrastructure List specifying the actual quantity, type, brand/model of the items. Host Country supplied items are shown in a separate column.

At each Competition, the Experts must review and update the Infrastructure List in preparation for the next Competition. Experts must advise the Technical Director 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.

Floor tolerance

The work area floor must be level within a maximum tolerance of 10 millimetres over the distance of 2 metres where the project will be built.

Size of work areas

The Competitor work area must be 5m by 5m. These dimensions cannot be varied in anyway.

7.2 Materials, equipment and tools supplied by Competitors in their toolbox

The Competitor must bring the following tools in a toolbox:

- Trowel
- Folding rule
- Measuring tools
- Mason's hammer
- Square
- Mallet
- Pencil
- Lump hammer
- Angle bevel
- Spirit level
- Pointing trowel
- Cleaning tools (Competitors can only use cleaning sponges supplied by the Host Country).
- Marking out string
- Large compass
- Safety footwear
- Ear and eye protection
- Flexible sheets marked out to bond size for - Bricks, Blocks, and pavers
- Mortar additives may be used to make mortar more workable (can be liquid or powder).
- Rendering tools
- Paving tools

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

Competitors are allowed to bring digital measuring devices to use during the Competition.

The only power tools that can be used in the Competition site are those supplied by the Host Member.

Profiles are permitted but must be assembled during Competition time.

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.

30, 45, 60 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.

7.3 Materials, equipment and tools supplied by Experts
None

7.4 Materials & equipment prohibited in the skill area
The use of brick cleaning fluids or oil is not allowed (that is, chemicals).

It will be explained to all Experts and Competitors that nothing is to come into or out of the site unless approved by the Chief Expert or Deputy Chief Expert. This includes any items that are being added or removed from toolboxes.

Power Tools

No power tools are permitted to be used except for:

- Power tools provided by the Host Country, minimum of one tool per four
- Battery operated drill – provided by Host Country
- Battery operated jigsaw – provided by Host Country

7.5 Sample workshop layouts

Workshop layouts from Calgary are available at:

http://www.worldskills.org/index.php?option=com_halls&Itemid=540

Workshop layout from previous Competition:



8. MARKETING THE SKILL TO VISITORS AND MEDIA

8.1 Maximising visitor and media engagement

Following is a list of possibilities to maximise visitor and media engagement:

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

8.2 Sustainability

- Recycling
- Use of 'green' materials
- Use of completed Test Projects after Competition