Module 28201-14 describes the information trainees will need in order to work with residential plans and construction drawings and convert that information into action on the job.

### Objectives

**Learning Objective 1**
- Describe the basic parts of a set of residential drawings and list the information found on each type of drawing.
  - a. Identify keys and legends, as well as selected lines, architectural terms, abbreviations, and symbols on residential drawings.
  - b. Explain how to use scales and dimensions in residential drawings.
  - c. Explain how to interpret the various types of residential drawings.

**Learning Objective 2**
- Explain how to estimate material quantities from residential drawings.
  - a. Explain how to use the rule-of-thumb method.
  - b. Explain how to use estimating aids.

### Performance Tasks

**Performance Task 1** (Learning Objective 2)
- From a plan, calculate the square footage of one elevation, including openings.

**Performance Task 2** (Learning Objective 2)
- Estimate the amount of brick and mortar from that same elevation.

**Performance Task 3** (Learning Objective 2)
- Estimate the size and number of lintel block for that same elevation.

### Teaching Time: 12.5 hours
(Five 2.5-hour sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

### Prerequisites

*Core Curriculum and Masonry Level One.*

### Before You Begin
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations and Performance Profile Sheets from [www.nccerirc.com](http://www.nccerirc.com). The passing score for submission into NCCER's Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
**Safety Considerations**

Safety is paramount in the masonry trade, and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

**Classroom Equipment and Materials**
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- *Masonry Level Two* PowerPoint® Presentation Slides
- LCD projector and screen
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing cold-formed steel framing *(optional)*
- TV/DVD player

**Equipment and Materials for Laboratories and Performance Testing**
- Architect’s scale
- Blank paper and pencil
- Calculators
- Elevation(s) for a residential structure
- Floor plan(s) for a residential structure
- Foundation drawing for a residential structure
- Samples of residential plans
- Samples of revisions and change orders
- Set of construction drawings, including the foundation plan, floor plan(s), and elevation(s)
- Set of residential plans

**Additional Resources and References**

This module presents thorough resources for task training. The following resource material is suggested for further study:


There are a number of online resources available for trainees who would like more information on residential plans and drawing interpretation. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into five 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**SESSION ONE**

Session One introduces keys and legends, lines, terms, abbreviations, and symbols.
1. Show Session One PowerPoint® presentation slides.
2. Review the use of plans with the trainees.
3. Discuss the use of keys and legends on drawings.
4. Discuss the types of lines used on drawings and their applications.
5. Review the terms and symbols used on drawings.

**SESSION TWO**

Session Two introduces scales and dimensions.
1. Show Session Two PowerPoint® presentation slides.
2. Discuss the use of dimensions on drawings and how the dimensions are applied for masonry openings.
3. Review scales used on residential drawings.

**SESSION THREE**

Session Three introduces interpreting residential drawings.
1. Show Session Three PowerPoint® presentation slides.
2. Discuss the general procedure for reading construction drawings.
3. Discuss the use of foundation plans, floor plans, and elevations for residential drawings.

**SESSION FOUR**

Session Four introduces estimating material quantities.
1. Show Session Four PowerPoint® presentation slides.
2. Discuss the importance of accurate estimates.
3. Discuss how to use the rule-of-thumb method to estimate.
4. Discuss how to calculate the square footage for an elevation, including openings.

**SESSION FIVE**

Session Five is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Four.) Answer any questions that trainees may have.
1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on Training Report Form 200 and submit the report to your Training Program Sponsor.
# Materials Checklist for Module 28201-14, Residential Plan and Drawing Interpretation

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>Architect's scale</td>
</tr>
<tr>
<td>Blank paper and pencil</td>
</tr>
<tr>
<td>Calculators</td>
</tr>
<tr>
<td>Samples of residential plans</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
</tr>
<tr>
<td>Samples of revisions and change orders</td>
</tr>
<tr>
<td>Floor plan(s) for a residential structure</td>
</tr>
<tr>
<td>Markers/chalk</td>
</tr>
<tr>
<td>Elevation(s) for a residential structure</td>
</tr>
<tr>
<td>Foundation drawing for a residential structure</td>
</tr>
<tr>
<td>Pencils and paper</td>
</tr>
<tr>
<td>Set of construction drawings, including the foundation plan, floor plan(s), and elevation(s)</td>
</tr>
<tr>
<td>Set of residential plans</td>
</tr>
<tr>
<td>Masonry Level Two PowerPoint\textsuperscript{®} Presentation Slides</td>
</tr>
<tr>
<td>LCD projector and screen</td>
</tr>
<tr>
<td>Computer</td>
</tr>
<tr>
<td>Copies of the Module Examination and Performance Profile Sheets</td>
</tr>
<tr>
<td>Vendor-supplied videos/DVDs showing cold-formed steel framing (optional)</td>
</tr>
<tr>
<td>TV/DVD player</td>
</tr>
</tbody>
</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 28202-14 describes the construction techniques for residential and small structure foundations, steps, patios, decks, chimneys, and fireplaces and work activities that the mason must perform, as well as those tasks that tie into the masonry work.

Teaching Time: 25 hours
(Ten 2.5-hour classroom sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

Prerequisites
Core Curriculum and Masonry Level One.

Before You Begin
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations and Performance Profile Sheets from www.nccerirc.com. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.

Objectives

Learning Objective 1
• Explain the requirements for construction of various types of residential foundations.
  a. Explain what spread foundations are.
  b. Explain what raft and mat foundations are.
  c. Explain what foundation walls are.

Learning Objective 2
• Identify and explain the characteristics, uses, and installation techniques for clay brick and concrete pavers.
  a. Describe the various types of clay brick pavers.
  b. Explain how to install clay brick pavers.
  c. Describe the various types of concrete and interlocking pavers.
  d. Explain how to install concrete and interlocking pavers.

Learning Objective 3
• Lay out and build steps, patios, and decks made from masonry units.
  a. Describe the various types of steps.
  b. Explain how to recognize patterns and tread designs.
  c. Explain how to build a concrete base.
  d. Explain how to set clay brick in steps.
  e. Explain how patios are constructed.
  f. Explain how decks are constructed.

Learning Objective 4
• Explain how to lay out and build fireplaces and chimneys.
  a. Explain the basic theory of the fireplace.
  b. Describe the parts of a fireplace.
  c. Explain the key points of workmanship.
  d. Explain how to lay out chimneys and fireplaces.
  e. Explain how to begin the fireplace.
  f. Explain how to finish the fireplace.
  g. Describe a multi-opening fireplace.

Performance Tasks

Performance Task 1 (Learning Objective 3)
• Lay out and construct a set of steps with three risers.

Performance Task 2 (Learning Objective 3)
• Lay out and construct a 5-foot by 7-foot clay brick patio section.
**Classroom Equipment and Materials**

- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- *Masonry Level Two* PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing residential masonry work (optional)
- TV/DVD player

**Equipment and Materials for Laboratories and Performance Testing**

- Appropriate PPE for masonry and cleaning work
- Bricks, mortar, and other supplies needed to build patios
- Examples of concrete pavers
- Examples of clay brick pavers
- Photos of fireplaces
- Copy of your local building code
- Masonry tools
- Level
- String line
- Mallets
- Bricks
- Mortar
- Photos of different types of masonry steps
- Photos of clay brick patterns
- Plans and specifications for a fireplace
- SDS/MSDS and application instructions for muriatic or other cleaning acid
- Unlabeled version of *Figures 7 and 36* from the Trainee Guide

**Additional Resources and References**

This module is intended to present thorough resources for task training. The following reference works are suggested for further study. These are optional materials for continuing education rather than for task training.


There are a number of online resources available for trainees who would like more information on cold-formed steel framing. A search for additional information may be assigned as homework to interested trainees.

Instructors should view any videos that may be identified in the lesson plan before using them to ensure their suitability. The videos can provide teachable moments in both proper and improper work processes and behaviors. Be prepared to stop the videos at appropriate times to point out and discuss both proper and improper conduct and techniques.

Instructors are encouraged to locate additional audiovisual aids available on the Internet, make personal videos, and take photos related to the subject matter and add them to the PowerPoint® presentations throughout the program.
The lesson plan for this module is divided into ten 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**Session One**
Session One introduces the requirements for residential foundations.
1. Show Session One PowerPoint® presentation slides.
2. Discuss the function of foundation walls and footings, and the various types.
3. Discuss the differences between raft and mat foundations.
4. Explain how foundation walls are built.

**Session Two**
Session Two introduces the characteristics, uses, and installation techniques for clay brick pavers.
1. Show Session Two PowerPoint® presentation slides.
2. Discuss the types of clay brick pavers.
3. Discuss the installation of brick pavers.
4. Explain how to clean and finish brick pavers.

**Session Three**
Session Three introduces concrete pavers.
1. Show Session Three PowerPoint® presentation slides.
2. Discuss the various types of concrete pavers.
3. Discuss how to begin installation of concrete pavers.

**Session Four**
Session Four continues concrete pavers.
1. Show Session Four PowerPoint® presentation slides.
2. Continue discussing installation of concrete pavers.
3. Discuss cleaning concrete pavers.

**Session Five**
Session Five introduces the construction of masonry steps.
1. Show Session Five PowerPoint® presentation slides.
2. Discuss various types of steps.
3. Discuss pattern and tread design.
4. Discuss how to install clay brick steps.

**Session Six**
Session Six introduces patios and decks.
1. Show Session Six PowerPoint® presentation slides.
2. Discuss how patios are constructed.
3. Explain how patio decks are constructed.

**Session Seven**
Session Seven introduces how to lay out and build fireplaces.
1. Show Session Seven PowerPoint® presentation slides.
2. Explain the basic parts and theory of a fireplace.
3. Explain the key points of fireplace workmanship.

**Session Eight**
Session Eight introduces how to lay out and build fireplaces.
1. Show Session Eight PowerPoint® presentation slides.
2. Explain how to lay out and begin to build a fireplace.
Session Nine

Session Nine introduces how to lay out and build fireplaces.
1. Show Session Nine PowerPoint® presentation slides.
2. Explain how to finish fireplace construction.
3. Discuss multi-opening fireplaces.

Session Ten

Session Ten is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Nine.) Answer any questions that trainees may have.
1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on Training Report Form 200 and submit the report to your Training Program Sponsor.
### Materials Checklist for Module 28202-14, Residential Masonry

<table>
<thead>
<tr>
<th>Personal protective equipment:</th>
<th>Examples of concrete pavers</th>
<th>Bricks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate PPE for masonry and cleaning work</td>
<td>Examples of clay brick pavers</td>
<td>Mortar</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Photos of different types of masonry steps</td>
<td>Mallets</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Photos of various types of clay brick patterns</td>
<td>String line</td>
</tr>
<tr>
<td>Pencils and paper</td>
<td>Photos of fireplaces</td>
<td>Bricks, mortar, and other supplies needed to build patios</td>
</tr>
</tbody>
</table>

**Masonry Level Two PowerPoint Presentation**

<table>
<thead>
<tr>
<th>Slides</th>
<th>Masonry tools</th>
<th>Plans and specifications for a fireplace</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlabeled version of Figures 7 and 36 from the Trainee Guide</td>
<td>Level</td>
<td>SDS/MSDS and application instructions for muriatic or other cleaning acid</td>
</tr>
</tbody>
</table>

| Copy of your local building code | Computer | Copies of the Module Examination and Performance Profile Sheets | Vendor-supplied videos/DVDs showing residential masonry work *optional* |

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 28203-14 describes the use of grout and other types of reinforcement, such as reinforcing steel, to strengthen and support masonry structures. The module also describes the locations where grout can be used and the techniques for placement.

### Objectives

**Learning Objective 1**
- Name and describe the primary ingredients in grout and how it is prepared.
  - a. Explain the characteristics of coarse and fine aggregates.
  - b. Explain the characteristics of admixtures.
  - c. Explain the role of water content in grout.
  - d. Explain why compressive strength is important.
  - e. Explain what mix specifications are and why they are important.
  - f. Explain the procedures for mixing grout.

**Learning Objective 2**
- Describe how grout is placed.
  - a. Explain what low-lift grouting is and how to place grout using this technique.
  - b. Explain what high-lift grouting is and how to place grout using this technique.
  - c. Explain why mortaring of joints for grouted masonry is important.
  - d. Explain how to use mechanical vibrators with grout.

**Learning Objective 3**
- Describe how to construct reinforced walls and masonry elements.
  - a. Explain how to cut and bend rebar.
  - b. Explain how to place rebar in reinforced walls.
  - c. Explain how to install bond beams and bond-beam lintels.
  - d. Explain how to install precast lintels.
  - e. Explain how to install piers, pilasters, and columns.

### Performance Tasks

**Performance Task 1** (Learning Objective 2)
- Place grout in a hollow block wall and properly consolidate it.

**Performance Task 2** (Learning Objective 3)
- Construct shoring for a masonry lintel.

**Performance Task 3** (Learning Objective 3)
- Build a masonry lintel out of CMU.

**Performance Task 4** (Learning Objective 3)
- Build a pier or pilaster.

### Teaching Time: 15 hours
(Six 2.5-hour classroom sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

### Prerequisites

*Core Curriculum and Masonry Level One*

### Before You Begin

As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations and Performance Profile Sheets from [www.nccerirc.com](http://www.nccerirc.com). The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
**Safety Considerations**

This module requires that trainees work with grout and potentially hazardous tools. Be sure trainees wear protective gear when working with grout and are mindful of sharp edges and other dangers in all labs. Safety is paramount in the masonry trade, and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

### Classroom Equipment and Materials
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- *Masonry Level Two* PowerPoint®
- Presentation Slides
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- TV/DVD player
- Vendor-supplied videos/DVDs *(optional)*

### Equipment and Materials for Laboratories and Performance Testing
- Personal protective equipment
  - Gloves
  - Eye protection
  - Respiratory protection
  - Hearing protection
  - Waterproof workboots
- Examples of rebar
- Grout and the materials to mix grout
- Grout pump for placing grout
- Hickey bar
- Hollow concrete block and mortar to form a wall
- Materials to build a masonry lintel from CMU
- Materials to build a pier or pilaster
- Materials to construct shoring for a masonry lintel
- Rod or mechanical vibrator
- Samples of grout ingredients
- Unlabeled version of Figure 23
- Various rebar cutters
- Various types of steel reinforcing bar
**Additional Resources and References**

This module presents thorough resources for task training. The following resource material is suggested for further study:


There are a number of online resources available for trainees who would like more information on reinforced masonry. A search for additional information may be assigned as homework to interested trainees.

Instructors should view any videos that may be identified in the lesson plan before using them to ensure their suitability. The videos can provide teachable moments in both proper and improper work processes and behaviors. Be prepared to stop the videos at appropriate times to point out and discuss both proper and improper conduct and techniques.

Instructors are encouraged to locate additional audiovisual aids available on the Internet, make personal videos, and take photos related to the subject matter and add them to the PowerPoint® presentations throughout the program.
The lesson plan for this module is divided into six 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**SESSION ONE**

Session One introduces the primary ingredients in grout and grout’s preparation.

1. Show Session One PowerPoint® presentation slides.
2. Present the ingredients used in grout and the function of each.
3. Discuss the differences between coarse and fine aggregates.
4. Discuss mix specifications and admixtures.
5. Discuss grout mixing procedures.

**SESSION TWO**

Session Two introduces trainees to how grout is placed.

1. Show Session Two PowerPoint® presentation slides.
2. Discuss the difference between low-lift and high-lift grouting techniques.
3. Discuss the importance of mortaring joints.
4. Demonstrate the safety and use of mechanical vibrators.

**SESSION THREE**

Session Three introduces trainees to the construction of reinforced walls and masonry elements.

1. Show Session Three PowerPoint® presentation slides.
2. Discuss the placement of rebar in reinforced walls.
3. Explain the installation of bond beams and bond beam lintels.
4. Explain the installation of precast lintels.
5. Explain the installation of piers, pilasters, and columns.

**SESSION FOUR**

Session Four introduces trainees to the construction of reinforced walls and masonry elements.

1. Show Session Four PowerPoint® presentation slides.
2. Explain the installation of bond beams and bond beam lintels.
3. Explain the installation of precast lintels.

**SESSION FIVE**

Session Five introduces trainees to the construction of reinforced walls and masonry elements.

1. Show Session Five PowerPoint® presentation slides.
2. Explain the installation of piers, pilasters, and columns.

**SESSION SIX**

Session Six is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Five.) Answer any questions that trainees may have.

1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on Training Report Form 200 and submit the report to your Training Program Sponsor.
### Equipment and Materials

<table>
<thead>
<tr>
<th>Personal protective equipment:</th>
<th>Examples of rebar</th>
<th>Hickey bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloves</td>
<td>Grout and the materials to mix grout</td>
<td>Hollow concrete block and mortar to form a wall</td>
</tr>
<tr>
<td>Eye protection</td>
<td>Grout pump for placing grout</td>
<td>Materials to build a masonry lintel from CMU</td>
</tr>
<tr>
<td>Respiratory protection</td>
<td>Various types of steel reinforcing bar</td>
<td>Materials to build a pier or pilaster</td>
</tr>
<tr>
<td>Hearing protection</td>
<td>Rod or mechanical vibrator</td>
<td>Materials to construct shoring for a masonry lintel</td>
</tr>
<tr>
<td>Waterproof workboots</td>
<td>Samples of grout ingredients</td>
<td>Unlabeled version of Figure 23</td>
</tr>
</tbody>
</table>

- Whiteboard/chalkboard: Various rebar cutters
- Markers/chalk
- Pencils and paper
- *Masonry Level Two* PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- TV/DVD player
- Vendor-supplied videos/DVDs (optional)

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 28204-14 provides instruction on the methods and materials used to install masonry openings and to tie wythes together and to structural elements.

**Objectives**

**Learning Objective 1**
- Describe the methods and materials used to install masonry openings.
  a. Describe how to use and install door and window frames.
  b. Describe how to use and install windowsills.
  c. Describe how to use and install steel lintels.
  d. Describe how to use and install chases and recesses.

**Learning Objective 2**
- Describe the methods and materials used to tie a single masonry wythe together.
  a. Describe how to use and install ladder and truss joint reinforcement.
  b. Describe how to use and install seismic reinforcements.

**Learning Objective 3**
- Describe the methods and materials used to tie two masonry wythes together.
  a. Describe how to use and install flexible anchors.
  b. Describe how to use and install horizontal anchors.

**Learning Objective 4**
- Describe the methods and materials used to tie a masonry wythe to structural elements.
  a. Describe how to use and install rigid ties and bolts.
  b. Describe how to use and install bearing plates.
  c. Describe how to use and install saddles.
  d. Describe how to use and install strap ties.

**Performance Tasks**

**Performance Task 1** (Learning Objective 1)
- Install a hollow metal door frame.

**Performance Task 2** (Learning Objective 1)
- Install a sill and a lintel.

**Performance Task 3** (Learning Objective 4)
- Install a bearing plate.

**Performance Task 4** (Learning Objective 4)
- Install a strap tie.

**Teaching Time: 15 hours**
(Six 2.5-hour classroom sessions)

Session time may be adjusted to accommodate your class size, schedule, and teaching style.

**Prerequisites**
*Core Curriculum, Masonry Level One, and Masonry Level Two, Modules 28201-14, 28202-14, and 28203-14.*

**Before You Begin**

As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations and Performance Profile Sheets from [www.nccerirc.com](http://www.nccerirc.com). The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
Classroom Equipment and Materials
Whiteboard/chalkboard
Markers/chalk
Pencils and paper
Masonry Level Two PowerPoint®
Presentation Slides
Computer
Copies of the Module Examination and Performance Profile Sheets
Vendor-supplied videos/DVDs (optional)
TV/DVD player

Safety Considerations
This module requires that trainees work with heavy masonry lintels. Safety is paramount in the masonry trade, and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

Equipment and Materials for Laboratories and Performance Testing
Personal protective equipment
  - Eye protection
  - Foot protection
  - Hand protection
  - Hard hat
Adjustable assemblies
Adjustable unit ties
Assorted masonry tools used to set door frames in place
Assorted specialty block, including bases, jambs, lintels, headers, and partition blocks
Bearing plates
Block
Box ties
Brick
Construction drawings for a masonry building
Corrugated straps
Corrugated ties
Flashing
International Building Code®
Knockdown metal door frames
Local building code
Lug sill
Manufacturer catalogs
Masonry saddles
Mason's tools
Mortar
Mortar mixer
Rigid ties and bolts
Samples of ladder-type horizontal joint reinforcement
Samples of truss-type horizontal joint reinforcement
Seismic anchors
Set of construction drawings
Set-up metal door frames
Slip sill
Steel lintels
Strap ties
Weeps
Wheelbarrow
Z-type ties
Additional Resources and References

This module presents thorough resources for task training. The following resource material is suggested for further study:


There are a number of online resources available for trainees who would like more information on masonry openings and metal work. A search for additional information may be assigned as homework to interested trainees.

Instructors should view any videos that may be identified in the lesson plan before using them to ensure their suitability. The videos can provide teachable moments in both proper and improper work processes and behaviors. Be prepared to stop the videos at appropriate times to point out and discuss both proper and improper conduct and techniques.

Instructors are encouraged to locate additional audiovisual aids available on the Internet, make personal videos, and take photos related to the subject matter and add them to the PowerPoint® presentations throughout the program.
The lesson plan for this module is divided into six 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**Session One**  
Session One introduces the installation of door frames.  
1. Show Session One PowerPoint® presentation slides.  
2. Identify the types of specialty block used for masonry openings.  
3. Discuss and demonstrate the installation of hollow metal door frames in masonry openings.

**Session Two**  
Session Two introduces the installation of sills and lintels.  
1. Show Session Two PowerPoint® presentation slides.  
2. Discuss and demonstrate the installation of brick sills.  
3. Discuss and demonstrate the method used to set a sill.  
4. Discuss and demonstrate the method used to install a lintel.  
5. Discuss the use of chases and recesses in buildings.

**Session Three**  
Session Three introduces tying a single wythe together.  
1. Show Session Three PowerPoint® presentation slides.  
2. Discuss and demonstrate the installation of horizontal joint reinforcement.  
3. Discuss the use of seismic reinforcement in masonry buildings.

**Session Four**  
Session Four introduces tying two masonry wythes together.  
1. Show Session Four PowerPoint® presentation slides.  
2. Discuss and demonstrate the installation of flexible and horizontal anchors.

**Session Five**  
Session Five introduces tying a masonry wythe to a structural element.  
1. Show Session Five PowerPoint® presentation slides.  
2. Discuss and demonstrate the installation of rigid ties and bolts.  
3. Discuss and demonstrate the installation of bearing plates.  
4. Discuss and demonstrate the installation of PA straps.

**Session Six**  
Session Six is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Five.) Answer any questions that trainees may have.  
1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.  
2. Record the testing results on Training Report Form 200 and submit the report to your Training Program Sponsor.
## Materials Checklist for Module 28204-14, Masonry Openings and Metal Work

<table>
<thead>
<tr>
<th>Personal protective equipment:</th>
<th>Adjustable assemblies</th>
<th>Adjustable unit ties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye protection</td>
<td>Assorted masonry tools used to set door frames in place</td>
<td>Assorted specialty block, including bases, jambs, lintels, headers, and partition blocks</td>
</tr>
<tr>
<td>Foot protection</td>
<td>Bearing plates</td>
<td>Block</td>
</tr>
<tr>
<td>Hand protection</td>
<td>Box ties</td>
<td>Brick</td>
</tr>
<tr>
<td>Hard hat</td>
<td>Construction drawings for a masonry building</td>
<td>Corrugated straps</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Corrugated ties</td>
<td>Flashing</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>International Building Code®</td>
<td>Rigid ties and bolts</td>
</tr>
<tr>
<td>Pencils and paper</td>
<td>Knockdown metal door frames</td>
<td>Slip sill</td>
</tr>
<tr>
<td>Masonry Level Two PowerPoint Presentation Slides</td>
<td>Local building code</td>
<td>Steel lintels</td>
</tr>
<tr>
<td>Computer</td>
<td>Lug sill</td>
<td>Strap ties</td>
</tr>
<tr>
<td>Copies of the Module Examination and Performance Profile Sheets</td>
<td>Manufacturer catalogs</td>
<td>Weeps</td>
</tr>
<tr>
<td>Vendor-supplied videos/DVDs (optional)</td>
<td>Masonry saddles</td>
<td>Wheelbarrow</td>
</tr>
<tr>
<td></td>
<td>Samples of ladder-type horizontal joint reinforcement</td>
<td>Samples of truss-type horizontal joint reinforcement</td>
</tr>
<tr>
<td>Mortar</td>
<td>Mortar mixer</td>
<td></td>
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<tr>
<td>Mason's tools</td>
<td>Seismic anchors</td>
<td></td>
</tr>
<tr>
<td>Set of construction drawings</td>
<td>Z-type ties</td>
<td></td>
</tr>
</tbody>
</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 28205-14 contains detailed information that directs the mason in accomplishing the actual construction of walls, arches, and other useful structures. The text explains construction techniques, safety requirements, and interaction with structure components.

### Objectives

#### Learning Objective 1
- Identify the structural principles and fundamental uses of basic types of walls.
  - a. Identify the structural principles and fundamental uses of solid masonry walls.
  - b. Identify the structural principles and fundamental uses of hollow masonry walls.
  - c. Identify the structural principles and fundamental uses of cavity walls.
  - d. Identify the structural principles and fundamental uses of composite walls.
  - e. Identify the structural principles and fundamental uses of anchored veneer walls.
  - f. Identify the structural principles and fundamental uses of retaining walls.
  - g. Identify the structural principles and fundamental uses of freestanding walls.

#### Learning Objective 2
- Identify the requirement for and function of control joints and expansion joints.
  - a. Identify the effects of temperature and moisture on control joints and expansion joints.
  - b. Identify the uses of control joints.
  - c. Identify the uses of expansion joints.

#### Learning Objective 3
- Lay out and construct various corners and intersections.
  - a. Lay out and construct toothing.
  - b. Lay out and construct corbeling.
  - c. Lay out and construct intersecting walls.
  - d. Lay out and construct angled corners.

### Performance Tasks

#### Performance Task 1 (Learning Objective 3)
- Lay out and construct a composite wall with control joints and expansion joints.

#### Performance Task 2 (Learning Objective 3)
- Lay out and construct intersections.

#### Performance Task 3 (Learning Objective 3)
- Lay out and construct angled corners.

### Teaching Time: 50 hours
(20 2.5-hour classroom sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

### Prerequisites
*Core Curriculum* and *Masonry Level One.*

### Before You Begin
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations and Performance Profile Sheets from [www.nccerirc.com](http://www.nccerirc.com). The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
Safety Considerations
This module requires that trainees layout and construct various wall samples. Safety is paramount in the masonry trade, and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

Classroom Equipment and Materials
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- Masonry Level Two PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs (optional)
- TV/DVD player

Equipment and Materials for Laboratories and Performance Testing
- Personal protective equipment
  - Eye protection
  - Foot protection
  - Hand protection
  - Hard hat
- Accessories to build a composite wall with expansion and control joints
- ACI 530-92/ASCE 5-92/TMS 402-92, Building Code Requirements for Masonry Structures
- Block
- Brick
- Building codes from various parts of the United States
- Design calculations from the Brick Industry Association
- Local building code
- Masonry accessories
- Masonry tools
- Metal ties
- Mortar
- Unlabeled versions of Figures 7–11, 13–14, 17–18, 20–21, 26, and 43–50 from the Trainee Guide

Additional Resources and References
This module presents thorough resources for task training. The following resource material is suggested for further study:


There are a number of online resources available for trainees who would like more information on advanced laying techniques. A search for additional information may be assigned as homework to interested trainees.

Instructors should view any videos that may be identified in the lesson plan before using them to ensure their suitability. The videos can provide teachable moments in both proper and improper work processes and behaviors. Be prepared to stop the videos at appropriate times to point out and discuss both proper and improper conduct and techniques.

Instructors are encouraged to locate additional audiovisual aids available on the Internet, make personal videos, and take photos related to the subject matter and add them to the PowerPoint® presentations throughout the program.
Session Outline for 28205-14

ADVANCED LAYING TECHNIQUES

The lesson plan for this module is divided into 20 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**SESSION ONE**
Session One introduces trainees to structural principles and uses of solid walls.
1. Show Session One PowerPoint® presentation slides.
2. Introduce trainees to structural principles and fundamental uses of solid masonry walls.

**SESSION TWO**
Session Two introduces trainees to structural principles and uses of hollow walls.
1. Show Session Two PowerPoint® presentation slides.
2. Introduce trainees to structural principles and fundamental uses of hollow walls.

**SESSION THREE**
Session Three introduces trainees to structural principles and uses of cavity walls.
1. Show Session Three PowerPoint® presentation slides.
2. Introduce trainees to structural principles and fundamental uses of cavity walls.

**SESSION FOUR**
Session Four continues cavity walls.
1. Show Session Four PowerPoint® presentation slides.
2. Continue cavity walls.

**SESSION FIVE**
Session Five continues cavity walls.
1. Show Session Five PowerPoint® presentation slides.
2. Continue cavity walls.

**SESSION SIX**
Session Six introduces trainees to structural principles and uses of composite walls.
1. Show Session Six PowerPoint® presentation slides.
2. Introduce trainees to structural principles and fundamental uses of composite walls.

**SESSION SEVEN**
Session Seven continues composite walls.
1. Show Session Seven PowerPoint® presentation slides.
2. Continue composite walls.

**SESSION EIGHT**
Session Eight introduces trainees to structural principles and uses of veneer walls.
1. Show Session Eight PowerPoint® presentation slides.
2. Introduce trainees to structural principles and fundamental uses of veneer walls.
Session Nine introduces trainees to structural principles and uses of retaining walls.
1. Show Session Nine PowerPoint® presentation slides.
2. Introduce trainees to structural principles and fundamental uses of retaining walls.

Session Ten continues retaining walls.
1. Show Session Ten PowerPoint® presentation slides.
2. Continue retaining walls.

Session Eleven introduces trainees to structural principles and uses of freestanding walls.
1. Show Session Eleven PowerPoint® presentation slides.
2. Introduce trainees to structural principles and fundamental uses of freestanding walls.

Session Twelve continues freestanding walls.
1. Show Session Twelve PowerPoint® presentation slides.
2. Continue freestanding walls.

Session Thirteen introduces trainees to the requirement for and function of control joints.
1. Show Session Thirteen PowerPoint® presentation slides.
2. Identify the effects of temperature and moisture on control joints.
3. Identify the uses of control joints.

Session Fourteen introduces trainees to the requirement for and function of expansion joints.
1. Show Session Fourteen PowerPoint® presentation slides.
2. Identify the effects of temperature and moisture on expansion joints.
3. Identify the uses of expansion joints.

Session Fifteen introduces the construction of toothing.
1. Show Session Fifteen PowerPoint® presentation slides.
2. Instruct trainees on how to lay out and construct toothing.
**Session Sixteen**

Session Sixteen introduces the construction of corbelling.

1. Show Session Sixteen PowerPoint® presentation slides.
2. Instruct trainees on how to lay out and construct corbelling.

**Session Seventeen**

Session Seventeen introduces the construction of intersections.

1. Show Session Seventeen PowerPoint® presentation slides.
2. Instruct trainees on how to lay out and construct intersecting walls.

**Session Eighteen**

Session Eighteen continues intersections.

1. Show Session Eighteen PowerPoint® presentation slides.
2. Continue intersecting walls.

**Session Nineteen**

Session Nineteen introduces the construction of angled corners.

1. Show Session Nineteen PowerPoint® presentation slides.
2. Instruct trainees on how to lay out and construct angled corners.

**Session Twenty**

Session Twenty is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Nineteen.) Answer any questions that trainees may have.

1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on Training Report Form 200 and submit the report to your Training Program Sponsor.
# Materials Checklist for Module 28205-14, Advanced Laying Techniques

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
<th>Personal protective equipment:</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Eye protection</td>
<td>Block</td>
<td>Metal ties</td>
</tr>
<tr>
<td>Foot protection</td>
<td>Brick</td>
<td>Mortar</td>
</tr>
<tr>
<td>Hand protection</td>
<td>Local building code</td>
<td>Masonry accessories</td>
</tr>
<tr>
<td>Hand protection</td>
<td>Building codes from various</td>
<td>Design calculations from the</td>
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<tr>
<td></td>
<td>parts of the United States</td>
<td>Brick Industry Association</td>
</tr>
<tr>
<td>Hard hat</td>
<td>Masonry tools</td>
<td>Accessories to build a</td>
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<tr>
<td></td>
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<td>composite wall with expansion</td>
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<td>and control joints</td>
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<tr>
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<td>Unlabeled versions of Figures</td>
<td>ACI 530-92/ASCE 5-92/</td>
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<td>7–11, 13–14, 17–18, 20–21, 26,</td>
<td>TMS 402-92, Building Code</td>
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<td>and 43–50 from the *Trainee</td>
<td>Requirements for Masonry</td>
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<td>Guide*</td>
<td>Structures</td>
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<tr>
<td>Markers/chalk</td>
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<td>Pencils and paper</td>
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<tr>
<td>Masonry Level Two</td>
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<tr>
<td>PowerPoint® Presentation</td>
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<td>Slides</td>
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<tr>
<td>Computer</td>
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<tr>
<td>Copies of the Module</td>
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<tr>
<td>Examination and Performance</td>
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<tr>
<td>Profile Sheets</td>
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<tr>
<td>Vendor-supplied videos/DVDs</td>
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<td>TV/DVD player</td>
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</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Lesson Plans for Module 28206-14

EFFECTS OF CLIMATE ON MASONRY

Module 28206-14 describes techniques used to construct openings in masonry walls, the application of insulation, and the effects of climate as they relate to the mason’s trade. The module also explains properties and uses of materials used in moisture and temperature control and describes various methods of insulating structures.

Objectives

Learning Objective 1
• Identify the various types of insulation used in conjunction with masonry construction, and explain installation techniques.
  a. Explain the concept of heat transfer.
  b. Explain the purpose of and installation procedures for internal insulation.
  c. Explain the purpose of and installation procedures for external insulation.

Learning Objective 2
• Identify the need for moisture control in various types of masonry construction, and describe the techniques used to eliminate moisture problems.
  a. Explain the purpose of and installation procedures for flashing.
  b. Explain the purpose of and installation procedures for weep vents.
  c. Explain the purpose of and installation procedures for waterproofing.

Learning Objective 3
• Explain the various techniques used to provide adequate protection during hot- and cold-weather masonry construction.
  a. Explain the role played by weather data and information in masonry construction.
  b. Explain the various techniques used to provide adequate protection during hot-weather masonry construction.
  c. Explain the various techniques used to provide adequate protection during cold-weather masonry construction.

Performance Tasks

Performance Task 1 (Learning Objective 2)
• Install a 4-foot section of base flashing.

Teaching Time: 15 hours
(Six 2.5-hour sessions)

Session time may be adjusted to accommodate your class size, schedule, and teaching style.

Prerequisites

Core Curriculum and Masonry Level One.

Before You Begin

As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations and Performance Profile Sheets from www.nccerirc.com. The passing score for submission into NCCER's Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
Safety Considerations
This module requires that trainees install flashing. Safety is paramount in the masonry trade, and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

Classroom Equipment and Materials
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- *Masonry Level Two PowerPoint® Presentation Slides
- LCD projector and screen
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing cold-formed steel framing (optional)
- TV/DVD player

Equipment and Materials for Laboratories and Performance Testing
- Personal protective equipment
  - Eye protection
  - Face protection
  - Hand protection
  - Respiratory protection
  - Hard hat
- Examples of different types of insulation
- Flashing
- Meteorological maps
- Modified version of Tables 4 and 5 from the *Trainee Guide*
- Mortar
- Tools to install flashing
- Unlabeled version of Figures 12, 15, and 21 from the *Trainee Guide*

Additional Resources and References
This module presents thorough resources for task training. The following resource material is suggested for further study:


There are a number of online resources available for trainees who would like more information on the effects of climate on masonry. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into six 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**SESSION ONE**
Session One introduces insulation in masonry construction.
1. Show Session One PowerPoint® presentation slides.
2. Explain heat transfer.
3. Explain insulation installation.

**SESSION TWO**
Session Two introduces methods of moisture control.
1. Show Session Two PowerPoint® presentation slides.
2. Introduce trainees to flashing and its installation.

**SESSION THREE**
Session Three introduces methods of moisture control.
1. Show Session Three PowerPoint® presentation slides.
2. Introduce trainees to the installation of weep vents and waterproofing.

**SESSION FOUR**
Session Four introduces how to protect against extreme weather in masonry construction.
1. Show Session Four PowerPoint® presentation slides.
2. Instruct trainees on how to obtain and use weather data.
3. Instruct trainees on how to protect masonry during hot-weather construction.

**SESSION FIVE**
Session Five introduces how to protect against extreme weather in masonry construction.
1. Show Session Five PowerPoint® presentation slides.
2. Instruct trainees on how to protect masonry during cold-weather construction.

**SESSION SIX**
Session Six is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Five.) Answer any questions that trainees may have.
1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on Training Report Form 200 and submit the report to your Training Program Sponsor.
# Materials Checklist for Module 28206-14, Effects of Climate on Masonry

## Equipment and Materials

<table>
<thead>
<tr>
<th>Personal protective equipment:</th>
<th>Unlabeled version of Figures 12, 15, and 21 from the <em>Trainee Guide</em></th>
<th>Modified version of Tables 4 and 5 from the <em>Trainee Guide</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye protection</td>
<td>Flashing</td>
<td>Mortar</td>
</tr>
<tr>
<td>Face protection</td>
<td>Meteorological maps</td>
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<td>Whiteboard/chalkboard</td>
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<td>Pencils and paper</td>
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<td><em>Masonry Level Two</em></td>
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<tr>
<td><em>PowerPoint® Presentation</em></td>
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<tr>
<td><em>Slides</em></td>
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<td>LCD projector and screen</td>
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<td>Computer</td>
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<tr>
<td>Copies of the Module Examination and Performance Profile Sheets</td>
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<tr>
<td>Vendor-supplied videos/DVDs showing cold-formed steel framing <em>(optional)</em></td>
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<tr>
<td>TV/DVD player</td>
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</tbody>
</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 28207-14 introduces the quality control requirements for masonry construction. In addition, the module presents procedures for inspection and testing of masonry materials and finished masonry construction.

Objectives

Learning Objective 1
- Describe how standards and specifications are used to ensure quality control throughout the masonry industry.
  a. Describe the standards and specifications that apply to masonry units, mortar, grout, and accessories.
  b. Describe the standards that apply to laboratory and field testing of masonry construction.

Learning Objective 2
- Describe how masonry sample panels and prisms are built and tested to ensure quality control on a project.
  a. Describe how to build sample panels.
  b. Describe how to build hollow masonry prisms.
  c. Describe how to build grouted masonry prisms.
  d. Describe how to prepare and test mortar and grout prisms.
  e. Describe how to conduct masonry tests.

Learning Objective 3
- Describe how mortar is tested to ensure quality control on a project.
  a. Describe how to perform sand tests.
  b. Describe how to perform mortar consistency tests.
  c. Describe how to perform brick absorption tests.
  d. Describe how to perform laboratory tests.

Learning Objective 4
- Describe how field inspections and observations are used to ensure quality control on a project.
  a. Describe why and how standards and codes inspections are performed.
  b. Describe why and how materials inspections are performed.
  c. Describe the types of observations that are undertaken during construction.
  d. Describe why and how construction tolerances are monitored.

Performance Tasks

Performance Task 1 (Learning Objective 2)
- Build a prism for mortar testing.

Performance Task 2 (Learning Objective 3)
- Perform a slump test.

Teaching Time: 22.5 hours
(Nine 2.5-hour sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

Prerequisites

Core Curriculum and Masonry Level One.

Before You Begin
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations and Performance Profile Sheets from www.nccerirc.com. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
### Safety Considerations

This module requires that trainees perform slump tests and the construction of prisms for mortar testing. Safety is paramount in the masonry trade, and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

### Classroom Equipment and Materials

- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- Masonry Level Two PowerPoint® Presentation Slides
- LCD projector and screen
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing cold-formed steel framing *(optional)*
- TV/DVD player

### Equipment and Materials for Laboratories and Performance Testing

#### Personal protective equipment
- Eye protection
- Face protection
- Foot protection
- Hand protection
- Hard hat

**ASTM C1019**

- ASTM specifications referenced in the *Trainee Guide*

#### Masonry tools
- Block
- Brick
- Cone mold and rod
- Construction drawings and/or contracts
- Eye dropper
- Grout

#### Laboratory equipment
- Laboratory scales
- List of required inspections for your local government
- Masonry tools
- Mock specifications with a submittal list
- Mortar
- Prism test materials
- Sample construction contracts with project specifications
- Sand
- Sand test sieves
- Siltation test jar
- Sodium hydroxide
- Vibrator
- Watch with second hand
Additional Resources and References

This module presents thorough resources for task training. The following resource material is suggested for further study:


There are a number of online resources available for trainees who would like more information on construction inspection and quality control. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into nine 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**SESSION ONE**
Session One introduces standards and specifications for quality control.
1. Show Session One PowerPoint® presentation slides.
2. Introduce trainees to the standards and specifications that apply to masonry.
3. Introduce trainees to the standards that apply to laboratory and field testing.

**SESSION TWO**
Session Two introduces sample panels and prisms.
1. Show Session Two PowerPoint® presentation slides.
2. Instruct trainees on the construction of sample panels.
3. Instruct trainees on the construction of various prisms.

**SESSION THREE**
Session Three introduces the testing of prisms.
1. Show Session Three PowerPoint® presentation slides.
2. Instruct trainees on the variety of tests for masonry prisms.

**SESSION FOUR**
Session Four introduces the testing of mortar.
1. Show Session Four PowerPoint® presentation slides.
2. Instruct trainees on performing sand tests.

**SESSION FIVE**
Session Five introduces mortar consistency and absorption tests.
1. Show Session Five PowerPoint® presentation slides.
2. Instruct trainees on performing mortar consistency tests.
3. Instruct trainees on the construction of brick absorption tests.
4. Demonstrate the performance of a slump test.
5. Have trainees perform a slump test.

**SESSION SIX**
Session Six introduces the performance of laboratory tests.
1. Show Session Six PowerPoint® presentation slides.
2. Introduce trainees to flow and flow-after-suction tests.
3. Introduce trainees to the cone penetration test.

**SESSION SEVEN**
Session Seven introduces the performance of field inspections.
1. Show Session Seven PowerPoint® presentation slides.
2. Instruct trainees on standards and codes inspections.
3. Instruct trainees on materials inspections.
**SESSION EIGHT**

Session Eight continues field inspections.

1. Show Session Eight PowerPoint® presentation slides.
2. Instruct trainees on monitoring structural elements during construction.
3. Instruct trainees on monitoring construction tolerances.

**SESSION NINE**

Session Nine is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Eight.) Answer any questions that trainees may have.

1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on Training Report Form 200 and submit the report to your Training Program Sponsor.
## Materials Checklist for Module 28207-14, Construction Inspection and Quality Control

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
<td><strong>Equipment and Materials</strong></td>
</tr>
<tr>
<td>Eye protection</td>
<td>Brick</td>
</tr>
<tr>
<td>Face protection</td>
<td>Eye dropper</td>
</tr>
<tr>
<td>Foot protection</td>
<td>Laboratory scales</td>
</tr>
<tr>
<td>Hand protection</td>
<td>Prism test materials</td>
</tr>
<tr>
<td>Hard hat</td>
<td>Sand test sieves</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Sodium hydroxide</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Vibrator</td>
</tr>
<tr>
<td>Pencils and paper</td>
<td>Construction drawings and/or contracts</td>
</tr>
<tr>
<td>Masonry Level Two PowerPoint Presentation Slides</td>
<td>ASTM specifications referenced in the Trainee Guide</td>
</tr>
<tr>
<td>LCD projector and screen</td>
<td>List of required inspections for your local government</td>
</tr>
<tr>
<td>Computer</td>
<td></td>
</tr>
<tr>
<td>Copies of the Module Examination and Performance Profile Sheets</td>
<td></td>
</tr>
<tr>
<td>Vendor-supplied videos/DVDs showing cold-formed steel framing <em>(optional)</em></td>
<td></td>
</tr>
<tr>
<td>TV/DVD player</td>
<td></td>
</tr>
</tbody>
</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.