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PREVIEW
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FINISHING THE BUILDING INTERIOR

Lesson One

Interior Walls and Ceilings

PREVIEW
COPY



TPC Training Systems

36301

Lesson**1****Interior Walls and Ceilings****TOPICS**

Plasterboard Construction
Application of Plasterboard Panels
Methods of Fastening Plasterboard
Methods of Cutting Plasterboard
Treatment of Corners and Edges
Construction of Drywall
Taping and Cementing Procedures
Metal Stud Drywall Systems

Prefinished and Plywood Paneling
Solid Lumber Paneling
Finishing Plaster Walls
Preparing Masonry Walls
Finishing Plasterboard Ceilings
Acoustical Tile Ceilings
Suspended Tile Ceilings

OBJECTIVES

After studying this Lesson, you should be able to...

- Explain how to fasten single-ply plasterboard panels to the stud framing for interior walls.
- Describe the three-step procedure for cementing and taping drywall construction.
- Name the advantages of a drywall system that uses metal studs.
- Explain how to install interior plywood paneling.
- Differentiate between the three coats of plaster required for plaster wall construction.
- Identify the main parts of the framing system for suspended tile ceilings.

KEY TECHNICAL TERMS

Plasterboard 1.01 gypsum board, commonly available in paper-bound 4x8-ft panels
Joint cement 1.04 water-based compound used with paper tape to conceal joints between wall-board panels
Mat knife 1.12 special tool for cutting gypsum board
Joint knife 1.18 tool for spreading joint cement on wall seams

Metal stud system 1.25 system of metal framing components that speed drywall construction
Paneling 1.33 plywood or hardwood sheets, plain or decorated, for finishing interior drywalls
Lath 1.44 metal or wood strips on which plaster sets
Furring strips 1.51 framing, usually wood, for mounting gypsum board on masonry surfaces

Finishing a building's interior begins only after its shell is complete—footings, foundations, structure, roofing, and siding. The carpenter has the important job of scheduling the work of electricians, plumbers, and others so no one delays the work of another.

Electricians, as a rule, run wiring and install outlet boxes after the interior is framed and the wall is covered only on one side. Installing lighting fixtures in ceilings requires close cooperation between the carpenter and the electrician.

Plumbers run water and drain lines after interior partitions are framed but before the walls are covered. A carpenter must consult plumbers about clearances for pipe chases (pipe concealing partitions) and plates behind the walls for hanging plumbing fixtures.

Plasterboard Construction

1.01 The most widely used finishing material for interior walls is gypsum board, also known as *plasterboard* or wallboard. Drywall is a name given to plasterboard construction to distinguish it from the older plaster-on-lath construction. Plasterboard is of uniform thickness and is bound by a specially treated paper on both faces and around its edges. Standard 4x8-ft panels are available in thicknesses of $\frac{3}{8}$, $\frac{1}{2}$, or $\frac{5}{8}$ in. You can sometimes buy oversize panels ranging up to 4x16 ft.

1.02 Plasterboard is easy to work with, resistant to fire, and not very costly. When properly taped, cemented, and painted, it looks very much like more costly plaster. Fire ratings, which depend on the panel thickness, are stamped on the backs of panels. They are expressed in terms of the time (in hours) that a panel will withstand a fire of average temperature. A $\frac{5}{8}$ -in thick panel, for example, has a fire rating of one hour. Doubling the thickness doubles the rating.

1.03 Double thicknesses of plasterboard also help to improve sound insulation. For the first ply, or layer, use standard plasterboard. For the second or finish layer, use a special plasterboard known as sound board. Sound board has a very smooth finish that is pierced with thousands of tiny perforations. Sound resistance ratings are stamped on the backs of panels. Called the STC (sound transmission class) ratings, they consist of a single number. Higher numbers indicate better resistance to sound transmission.

Application of Plasterboard Panels

1.04 Plasterboard panels are tapered along their long edges so they are thinner at the edge than in the center.

This permits you to apply tape and *joint cement* (or joint compound) to finish the seams without producing bulges on the flat surface of a wall (Fig. 1-1). You can apply panels with their long, tapered edges either horizontal or vertical. With horizontal edges, the construction is stronger, because fewer seams run parallel to the studs. With vertical edges, construction is easier, because you don't have to lift and hold the panels in place.

1.05 Vertical seams will occur along certain studs at regular spacing. When you cover both sides of a stud wall with plasterboard, avoid having the seams on both sides fall on the same stud. After covering one side of the wall, start the other side with a piece of plasterboard cut to an odd width. This will result in staggering the seams on the studs.

1.06 Begin applying plasterboard panels to stud frames in places where you can use full panels. Leave a small opening between adjoining panels so the joint compound that you will apply later can seep into the seam for a better bond. Never force plasterboard into a

Fig. 1-1. Applying tape and cement to wall seam



Fig. 1-2. Recommended fasteners for plasterboard

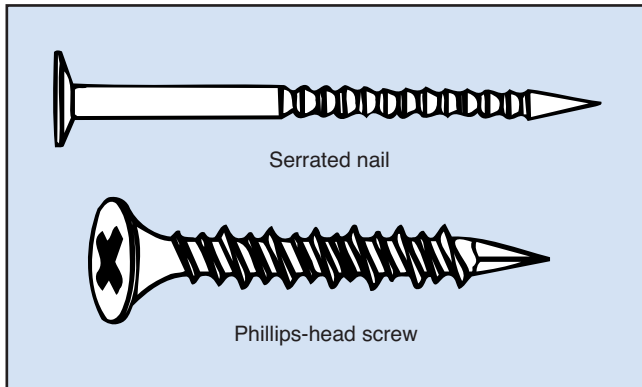
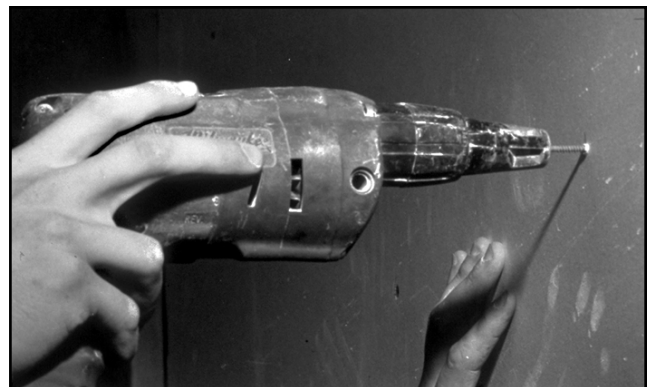


Fig. 1-3. High-speed screw gun with depth gauge



space that is too tight. It is very brittle, and it breaks easily. Forcing the panels may cause bulges that will be hard to feather out when you apply the joint cement.

Methods of Fastening Plasterboard

1.07 For single-ply coverage, fasten plasterboard panels with drywall nails or screws 1/4 in long, like those shown in Fig. 1-2. To apply the nails (which have 1/4-in heads), use a crown-headed hammer, which has a slightly convex striking face. Drive the nails slightly below the panel surface into the dimple formed by the hammer's head. Be careful not to crack the gypsum stock or break its paper coating. Table 1-1 shows which nails to use for various thicknesses of board.

1.08 To apply drywall screws, use a high-speed screw gun equipped with a clutch and a depth gauge, as shown in Fig. 1-3. This tool has a magnetized Phillips No. 2 tip that turns only when you apply pressure to

engage the clutch. To help you set each screw to an exact depth, the tip stops instantly when you release the pressure. The adjustable depth gauge serves as a guide.

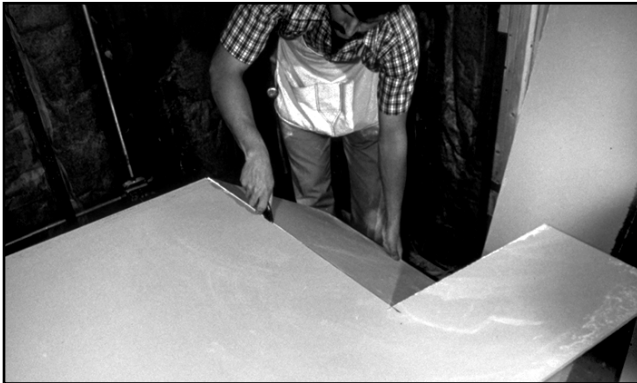
1.09 Tack the first panel into place with a few nails or screws. Then mark on the panel face the locations of the studs that are now concealed by the panel. That is, measure from the edge of the panel and mark the stud spacing—16 in or 24 in OC, etc. Then use a level to extend the marks up across the panel's face. Secure the panels to the studs with fasteners spaced about 6 in apart, and at least 1/4 in from the edges of the panels. Where one panel adjoins another, stagger the fasteners to prevent bulges.

1.10 You can also attach plasterboard to stud walls with wallboard adhesives. Adhesives reduce the number of fasteners you need to secure the panels—so you need less joint cement to conceal the fasteners in the final stages. Lay a 3/8-in bead of adhesive down the center of each stud with a caulking gun. Use zigzag beads

Table 1-1. Nails recommended for fastening plasterboard

3/8 in thickness	GWB-54 0.098 gauge, 1/4 in flat, slightly countersunk head, annular or helical thread, slight taper.	
	4d, 14 gauge, 1 3/8 in long, 7/32 in flat head.	
1/2 in thickness	GWB-54 0.098 gauge, 1/4 in flat, slightly countersunk head, annular or helical thread, slight taper.	
	5d, 13 1/2 gauge, 1 5/8 in long, 15/64 in flat head.	
5/8 in thickness	6d, 13 gauge, 1 7/8 in long, 1/4 in flat head.	

(Nails shown actual size)

Fig. 1-4. Making L-shaped cutout in a panel

where the edges of adjoining panels meet on a single stud. Press the panels firmly against the studs, and hold them in place with fasteners until the adhesive dries.

1.11 After you have mounted as many uncut panels as possible on the wall, measure the remaining, irregular areas and lay out the pieces that must be cut to fit them. Take as many measurements as necessary to assure accuracy.

Methods of Cutting Plasterboard

1.12 You can cut plasterboard with several tools. The fastest and commonest method is to score the paper on the front face with a *mat knife* and snap the board back along the scored line. Then slit the paper on the back face with a knife. Always cut an irregular piece $\frac{1}{4}$ in smaller than the area it is to cover. Use cement and tape—or molding, where possible—to cover gaps that surround irregular pieces.

1.13 You cannot form L-shaped pieces by scoring and snapping alone. You must first cut one of the legs with a saw. Then you can score and snap the other leg (Fig. 1-4). A wallboard saw with rough, jagged teeth is best for this procedure. Although you can use a standard compass saw, the practice is not recommended. Gypsum board dulls a compass saw quickly, making it useless for cutting anything else.

1.14 For large drywall installations, it is helpful to have a long metal straightedge or a large T-square specially designed for plasterboard work. Use it to lay out lines and to guide the mat knife when scoring panels. You can lay out long lines on the panels with a carpenter's chalkline.

Treatment of Corners and Edges

1.15 Because plasterboard panels are so brittle, it is necessary to reinforce their corners with metal beads. Obtain the beads from your building supplier. The beads bend and deform easily, so be careful when storing and installing them. Press each bead over a corner and fasten it with nails or screws. Don't bend the bead's flanges, and don't let the head of the nail or screw protrude above the wall surface.

1.16 Other types of metal beads, called J-beads and L-beads, are also available to achieve special design effects and to protect edges around openings. Pictured in Fig. 1-5 on the following page, these beads come in various sizes. You must select them according to the thickness of the panels they're reinforcing.

Construction of Drywall

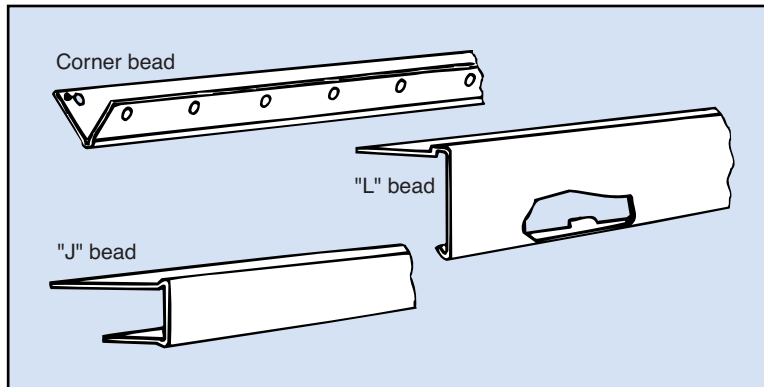
1.17 To produce a smooth, even drywall finish that resembles plaster, you must conceal the joints, corner beads, and fasteners with a joint cement. Five-gal pails of cement are the most practical for average projects. The compound is available in containers of many different sizes, however.

1.18 **Drywall tools.** The tools required for finishing drywall include *joint knives* (in three sizes) and a hawk (a type of pallet). Drywall installers prefer 4-in, 8-in, and 10-in knives for each successive application of joint compound. When you tape the seams, take an ample quantity of joint cement from the pail, transfer it to the hawk, and apply it to the wall with a knife. Scrape excess or dried cement from the knife on the edges of the hawk. Because the compound dries so quickly, never leave a pail of it uncovered and exposed to the air.

1.19 **Work area.** Before you begin your finishing operations, make sure your work area is broom clean and as free from dust as possible. Maintain this cleanliness during the entire taping operation.

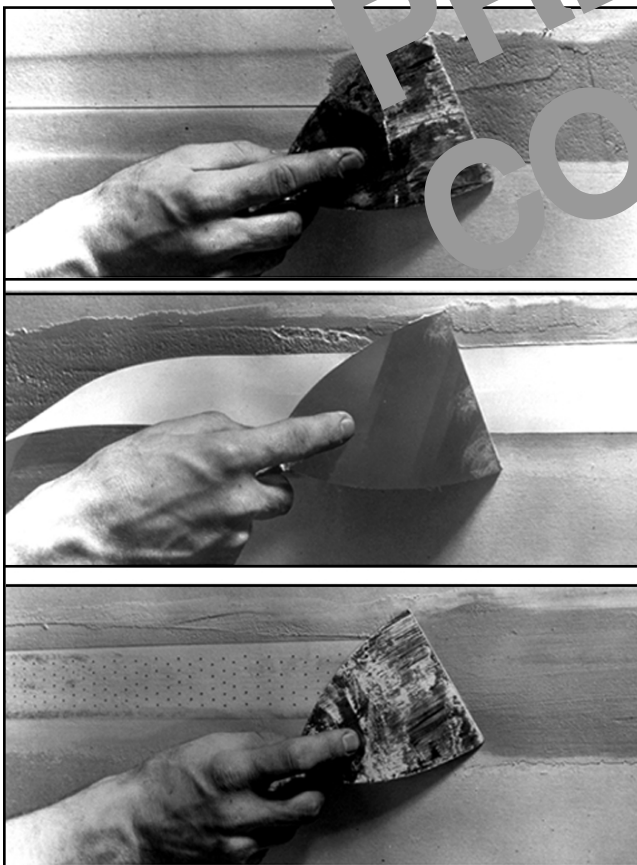
Taping and Cementing Procedures

1.20 Three steps are necessary to complete the taping and cementing process. The first step is to apply an ample bed of joint compound over the joints with a

Fig. 1-5. Protective beads for edges and corners

4-in knife, as shown in Fig. 1-6. Apply paper tape over the joints to keep cracks from developing when the cement dries. It starts drying in about 10 minutes, so do not apply the cement to more joints than you can cover with tape in that length of time.

1.21 After applying the first coat of compound, tear off a piece of paper tape slightly longer than

Fig. 1-6. Steps in taping a drywall joint

the joint to be covered. Press it into the wet cement so that it sticks evenly. Use the knife to press out the excess cement from beneath the tape, and make sure the tape bonds firmly at all points. Take care not to leave any wrinkles or air bubbles. Be sure the joint compound covers all nail and screw heads. Finally, scrape off the excess and let the first coat dry for 24 hrs.

1.22 Inside corners and joints between the wall and ceiling require special treatment. Apply a coating of joint cement to both of the surfaces that form the corner. Then fold the paper tape lengthwise down its center and press it into the wet compound (Fig. 1-7). Scrape off the excess cement.

1.23 The second step is to apply another coat of cement over the joints with a 6 or 8-in knife. Feather the edges of this coat so they are even with the wall surface. Give the heads of the fasteners a second coat also. You must apply the compound quickly. Be sure not to work it too much, because it dries quickly. Scrape off the excess cement, and let this second coat dry thoroughly before applying the third.

1.24 Before starting the third coat, sand the second coat lightly. Sand all lumps and burrs with a medium-grade sandpaper. When sanding, be careful not to damage the paper binder of the board itself. Then apply the third coat of joint compound with a 10-in knife. Carpenters often add water to a pre-mixed compound to obtain a thinner consistency and a smoother finish in the third coat. This may reduce the need for sanding the third coat when it is dry.

Metal Stud Drywall Systems

1.25 *Metal stud systems* are widely used in building walls and partitions that are to be finished with drywall. Metal stud systems (Fig. 1-8) consist of two basic parts: tracks that serve as toe plates, top plates, and headers; and studs. The studs are only slightly different in design from the tracks. Sometimes metal braces are added to give the wall frame greater rigidity. Metal studs are available in sizes ranging from 2x2 to 2x6 ft—just like the nominal sizes of lumber used for interior framing.

1.26 Metal studs have become popular because they reduce labor and material costs a great deal. You can easily attach the thin-gauge steel tracks to floors and ceilings with most common fasteners. For high-production tasks, you can use power-actuated tools and special fasteners to set toe and top plates in place. Cut the studs to size with metal shears, and insert them between the plates. Metal studs are usually spaced on centers that correspond to those for wood studs of the same size.

1.27 Fasten studs to the tracks with a special crimping tool that eliminates clumsy toe-nailing. Most carpenters crimp studs to the toe plate only, leaving the tops of the studs free. Later on, the application of drywall with self-tapping screws adds rigidity to the track-and-stud assembly. Because drywall is attached to the studs with special screws, you should have a screw gun if you do much of this type of construction.

1.28 Framing rough openings in metal stud walls requires special procedures. First, form a metal track header by cutting off a piece of track a couple of inches longer than the width of the opening. Center and lay out the opening width on the piece, and cut the track flanges along the layout marks. Then bend the track back along the cuts at each end, and attach the header by the flanges of the bent sections to the studs on either side of the opening.

1.29 You can either crimp the header into place or, for greater strength, fasten it to the studs with $\frac{1}{4}$ -in self-tapping Phillips-head screws—sometimes called metal-to-metal screws. Rough openings made with metal studs are often lined with wood for greater rigidity and easier installation of the finished jambs.

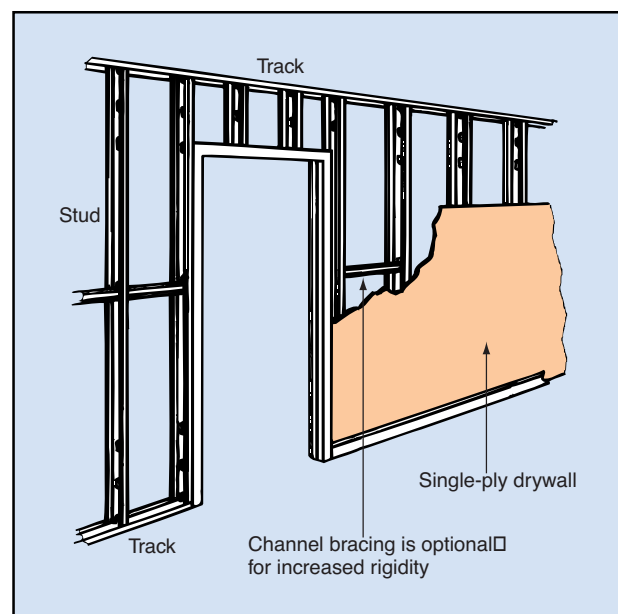
1.30 When framing with metal studs, be sure you know the places where fixtures and trim, if any, will be nailed to the walls in the final stages. Add wood blocking to the frame at these points because metal studs won't hold the nails.

The Programmed Exercises on the following page will tell you how well you understand the material you have just read. Before starting the exercises, remove the REVEAL KEY from the back of your Book. Read the instructions printed on the Reveal Key. Follow these instructions as you work through the Programmed Exercises.

Fig. 1-7. Applying tape in the corner of a room



Fig. 1-8. Details of metal stud framing system



10 Programmed Exercises

1-1. The most widely used finishing material or interior walls is gypsum board or _____.	1-1. PLASTERBOARD or WALLBOARD Ref: 1.01
1-2. When applying plasterboard panels, drive the nails with a(n) _____ headed hammer.	1-2. CROWN Ref: 1.07
1-3. The best tool for scoring plasterboard panels is a(n) _____.	1-3. MAT KNIFE Ref: 1.12
1-4. The brittle corners of plasterboard panels are usually reinforced with metal _____.	1-4. BEADS Ref: 1.15
1-5. To produce a smooth finish, fill the joints between plasterboard panels with _____.	1-5. JOINT CEMENT or JOINT COMPOUND Ref: 1.17
1-6. The first step in finishing a wall consists of applying joint compound and _____.	1-6. PAPER TAPE Ref: 1.20
1-7. If the joint compound is too thick, you can always thin it by adding _____.	1-7. WATER Ref: 1.24
1-8. An alternative to using wood studs in drywall construction is to use _____ studs.	1-8. METAL Ref: 1.25

Prefinished and Plywood Paneling

1.31 Next to the drywall finish, covering interior walls with prefabricated paneling is probably the most popular finishing method. At a very reasonable cost, paneling adds a decorative element, resembling solid lumber paneling.

1.32 A wide variety of decorative panels is available, ranging from the standard 4x8-ft size to the 5x16-ft panels. Before ordering panels, study the room size carefully so you can do the task with as few seams as possible. For example, if the ceiling height is 11 ft, you could eliminate an unsightly seam midway up the wall by selecting 4x12 panels, cutting a foot off each, and positioning them on end.

1.33 Both plywood and hardwood are used in making *paneling*. Depending on the moisture in the air, both materials are likely to expand or contract. So that the panels can adjust to the moisture conditions, unwrap them and let them stand (singly) around the room for a day or so. Panels installed when drier than normal tend to buckle as they expand and push against each other along the seams.

1.34 You can install paneling directly on the studs or over plasterboard sheathing. Most paneling is rather thin, and a layer of plasterboard beneath it adds rigidity to the walls. When applying paneling over plasterboard, coat the backs of the panels with adhesive and nail the panels into place. Use regular paneling nails, which are relatively thin and have annular rings for greater holding power. Some nails are colored.

1.35 You can cut paneling with a crosscut hand saw or a power saw with fine teeth. When cutting across the face grain of plywood, score the panel with a mat knife before sawing. Nail each panel to the studs at intervals of 8 in. Place the nails in the least noticeable positions—usually along the grooves that are part of the design in most popular panels. If you mark a panel when installing it, touch it up with a crayon or a colored pencil.

1.36 When installing panels, be sure their vertical edges are plumb. Joints between panels must be tight. Don't worry about rough edges along the floor or ceiling; you can conceal them with base or crown moldings. You can obtain matching inside and outside corner moldings for most panel designs. Be sure,

however, that the corner panels fit closely at these points before you mount the moldings. If the seams between panels are really too noticeable, you can nail decorative vertical strips, or battens, over them. Nail each batten to one panel only.

1.37 When installing paneling, always remember to establish a continuing pattern from one panel to an adjoining one. The most common designs, which have a random groove pattern, need little special attention. But if you place one panel above another on the wall, you must align the grooves in both panels. If a door is to be paneled to match a wall, you'll probably need to cut a piece for the door to match the paneling around the door.

1.38 Always strive for regularity and uniformity in paneling installations. The basic rule is "work from the openings." First line up the vertical joints above the doors, and above and below the windows. Then divide the remaining wall area into a consistent pattern.

Solid Lumber Paneling

1.39 Tongue-and-groove end-matched lumber, as well as other designs, is often used for finishing interior walls. Solid lumber panels range in color value from light pine to deep mahogany. Sometimes lumber with defects—like knotty pine or pecky cedar—is selected for its rustic appearance.

1.40 It is common practice to apply lumber panels vertically along the framing. To prepare for an installation of this type, you must attach additional horizontal framing between the studs to serve as a nailing base for the panels. Regardless of the thickness of the panels, don't space the framing pieces farther apart than 48 in OC. For panels less than $\frac{5}{8}$ in thick, 24 in OC will do fine.

1.41 When you apply lumber panels horizontally to framing, you need no special preparations. Nail each board directly to the studs through its tongue. When fitting the adjoining panel over the tongue, conceal the heads of the finish nails by a method called blind nailing. Your supervisor can show you how to do this.

1.42 Take the time to cut solid lumber paneling so it fits neatly and tightly. When you establish a pattern, maintain it throughout the entire room. Be sure to match lumber for adjoining walls as closely

as possible for color. Overall, solid lumber paneling is attractive, reasonably priced, and fairly easy to install and maintain.

Finishing Plaster Walls

1.43 Because of its attractive appearance, versatility, and fire and moisture resistance, plaster was once the most widely used finishing material for interior walls. It is now less commonly used—because it requires a great amount of skill and time. Carpenters rarely apply plaster themselves, but their skills are needed to prepare walls for applying plaster. So you should have an idea of what’s involved in the plastering process.

1.44 Plaster requires a surface or base on which to spread it. The general term for this base is *lath* (Fig. 1-9). Thin wood strips with small spaces between them once served as lath. In modern practice, however, lath consists of gypsum board or metal strips. Metal lath is more common in industrial construction.

1.45 The commonest type of metal lath is like a heavy-gauge screen. Another widely used type is expanded metal lath, which has slits machined into it to which the plaster “keys” and then sets. Standard panels of metal lath measure 27x96 in.

1.46 Lath is usually applied to a wall over a layer of 15-lb felt. The edges of metal lath are usu-

ally overlapped for reinforcement. Edges of the metal corner beads (applied to outside corners) protrude ½ in beyond the lath surface to serve as guides for the three thicknesses of plaster that will be applied.

1.47 Boards 2 or 3 in wide and the same thickness as the finished plaster are nailed along the toe plates to serve as guides, or grounds, for the plasterers. They also form a nailing base for the baseboard moldings that will be applied during the final stages. Nail temporary grounds around all door openings to indicate the desired wall thickness to the plasterers.

1.48 For all applications of the plaster base, use blued or galvanized fasteners that resist rust. Nail the lath at each stud or joist with nails about 6 in apart. When using gypsum lath, reinforce it with metal lath around openings in walls and beneath wood beams in ceilings (Fig. 1-10). This prevents plaster from cracking as the frame shrinks with age.

1.49 As a rule, plaster is applied in three coats. The first, or scratch, coat is a mixture of sand, gypsum plaster, and water which is raked when partially dry to achieve a rough texture. The second, or brown, coat is applied over the scratch coat and leveled to the grounds. The third, or finish, coat is a mixture of gypsum and slaked lime. Apply it several days after finishing the brown coat. The three coats should total at least ½ inch in thickness.

Fig. 1-9. Various types of lath for plaster wall

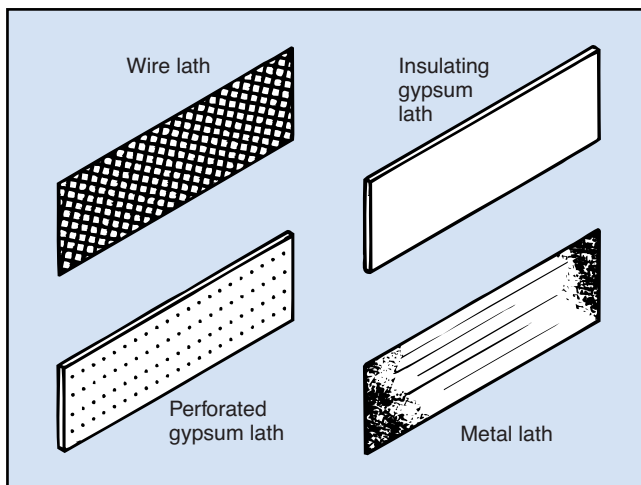
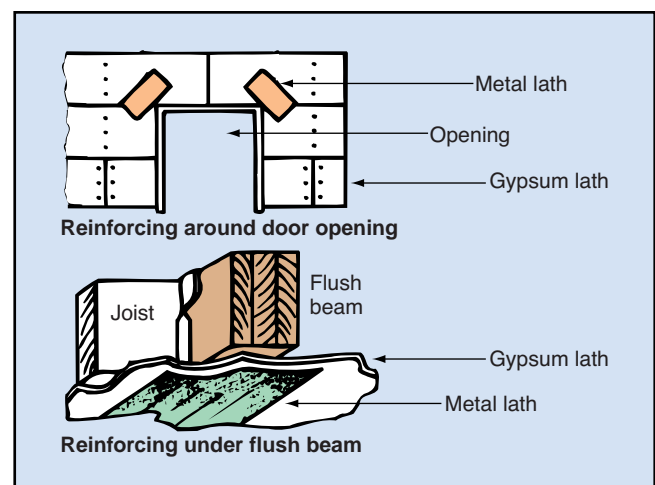


Fig. 1-10. Reinforcing wall openings with metal lath



Preparing Masonry Walls

1.50 Plaster is the only common finishing material that you can apply directly to concrete or block walls. For exterior (foundation) walls especially, it is necessary to prepare the masonry by adding insulation and vapor barriers. These items are usually covered in the job specifications. You must make the arrangements for installing them.

1.51 You cannot apply materials like gypsum board and paneling directly to masonry, because they need nails or screws for fastening. You must first mount *furring strips* on the masonry to provide a nailing base for these materials, as well as for insulation. Furring strips, as a rule, are 1x2-in or 1x3-in common lumber. Metal furring is also available through your building supplier.

1.52 Use 1½-in steel-cut or masonry nails to mount furring strips. Drive the nails into the mortar joints in block walls. Nails driven at an angle hold better than those driven straight. Space the furring strips—either horizontally or vertically according to the specs for the finishing material. If you need to, place shims under the furring to make a smooth surface on which to mount the finishing material.

Finishing Plasterboard Ceilings

1.53 Plasterboard, acoustical tile, and suspended tile are the materials most often used for finishing

ceilings. You can install a plasterboard ceiling by applying wallboard—directly to the undersides of floor or roof joists. Additional framing may be required around the perimeter of the room to serve as a nailing base for the edges of the wallboard panels. If both the walls and ceiling are to be plasterboard, apply the plasterboard to the ceiling first.

1.54 Plasterboarding a ceiling is usually a three-person task. It is helpful to build supports (Fig. 1-11) to hold the panels in place while you secure them to the frame. Fasteners spaced 6 in apart are needed for ceiling panels. Tape and cement the ceiling joints just as you do those in the walls.

1.55 Where overhead pipes and other equipment are to be concealed, a dropped plasterboard ceiling may be specified. This calls for building a ceiling frame and anchoring it to the outer walls. The lumber size for the frame varies with its span and the weight of the plasterboard. If the ceiling joists are 2x4s, use strap ties anchored to the structural framing members every 8 ft.

Acoustical Tile Ceilings

1.56 Acoustical tiles, so called because they dampen sound, are made from a variety of materials including asbestos, fiberboard, fiberglass, and metal. Most tiles are 12x12 in. You can tack them to furring nailed to the joists of an upper floor, or apply them over any smooth surface with adhesive.

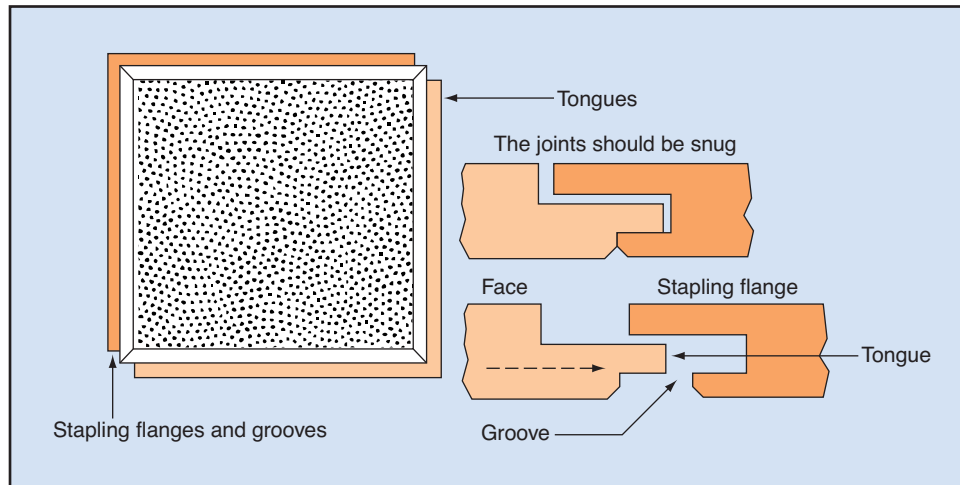
1.57 Acoustical tiles have stapling flanges and grooves on two adjacent sides (Fig. 1-12 on the following page). Staple or tack the tiles to the furring through their flanges, and then slip the next tile into place so that its tongue enters the groove in the preceding tile. You will be able to conceal all of the tile fasteners with this method. (See Fig. 1-13 on the following page.)

1.58 It is important to lay out the ceiling carefully when installing acoustical tile. Measure the length of the walls to determine how many uncut tiles you can use along each one. Because standard tiles are 1 ft square, the number of uncut tiles equals the wall length rounded down to the nearest foot.

1.59 The ceiling borders along opposite walls of a rectangular room must be equal to give the room a symmetrical appearance. Thus, if a room is 16 ft 8 in

Fig. 1-11. Support ceiling panels while securing them



Fig. 1-12. Method of interlocking acoustical tile

wide, you can use 16 uncut 1-ft tiles. You must divide the odd 8 in, however, and cut the remaining tiles to a 4-in width to fit along each wall. The tiles are soft, so you can cut them readily with a mat knife.

Suspended Tile Ceilings

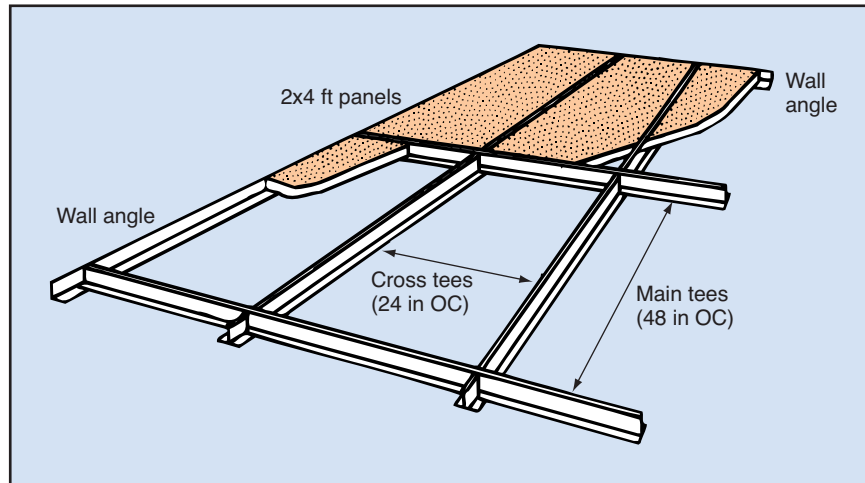
1.60 Like dropped plasterboard ceilings, suspended tile ceilings (Fig. 1-14) serve to conceal mechanical components and other unsightly overhead features. Do not install a suspended ceiling until all of the other finishing operations are complete.

1.61 Suspended ceiling systems consist of four main parts, as shown in Fig. 1-15:

- wall angles, which are metal extrusions applied to the walls at the desired ceiling height
- main tees, which span the shorter dimension of the room from wall to wall
- cross tees, T-shaped channels that interlock perpendicularly with the main tees to form a rigid frame or grid
- fiber tiles, usually 2x4 ft in size, which simply rest on the frame.

1.62 The first steps in installing a suspended ceiling are to determine its height—and to snap a chalkline around the walls of the room at that height. Then attach

Fig. 1-13. Stapling ceiling tiles to furring strips**Fig. 1-14. Installing a suspended tile ceiling**

Fig. 1-15. Grid construction for suspended ceiling

the wall angles according to manufacturer's instructions. Cut the angles to size with tin snips, and secure them to the walls with nails or self-tapping screws.

1.63 Next, cut the main tees to size (with tin snips or a fine-toothed hacksaw), and set them in place resting on the wall angles. Attach the tees to the ceiling joists with tie wires at 8-ft intervals. Use additional tie wires at points where lighting fixtures will rest on the frame. Install tie wires so you can loosen them readily to raise or lower the frame for final leveling.

1.64 Now, with all the main tees hung, set the cross tees in place in the fittings that lock them to the main tees. When forming the frame, keep in mind the standard 2x4-ft tile size—and plan ahead

for the symmetry of the ceiling. Divide any space remaining (after applying uncut tiles) between the gaps left along opposite walls, just as you did with acoustical tiles.

1.65 When the frame is complete and level, set the fiber tiles in place on it. Because the tiles are slightly larger than the frame openings, you must thread them through the frame (diagonally) from below and set them in the channels formed by the tees. All tiles must lie evenly, with no gaps between their edges and the frame. Never force a fiber tile into place. You can readily cut fiber tiles with a mat knife when fitting them into the gaps along the walls. Be sure your hands are clean when setting these tiles. Because of their light color, dirt and stains show very easily.

16 Programmed Exercises

1-9. You can strengthen prefab paneling by laying it over _____ sheathing.	1-9. PLASTERBOARD Ref: 1.34
1-10. Always conceal the rough upper and lower edges of vertical panels with _____.	1-10. MOLDINGS Ref: 1.36
1-11. Applying lumber panels vertically requires additional _____ between the studs.	1-11. FRAMING Ref: 1.40
1-12. The preparation of walls for plastering is usually done by _____.	1-12. CARPENTERS Ref: 1.43
1-13. Lath for plaster applications should be nailed with rust-resistant blued or _____ fasteners.	1-13. GALVANIZED Ref: 1.48
1-14. To nail boards and paneling to masonry surfaces, you must install _____ on the masonry first.	1-14. FURRING STRIPS Ref: 1.51
1-15. The commonest size of acoustical tiles is _____.	1-15. 12x12 IN Ref: 1.56
1-16. Acoustical tiles have stapling flanges and _____ on two adjacent sides.	1-16. GROOVES Ref: 1.57, Fig. 1-12

Answer the following questions by marking an "X" in the box next to the best answer.

- 1-1. Sound insulation can be improved by using
- a. sound board
 - b. double thicknesses of plasterboard
 - c. materials with high STC ratings
 - d. any of the above
- 1-2. You can reduce the number of fasteners you need to secure panels in place by using
- a. wallboard adhesives
 - b. metal beads
 - c. drywall screws
 - d. joint compound
- 1-3. Which of the following should you do when cutting plasterboard to irregular sizes?
- a. Make the pieces $\frac{1}{4}$ inch oversize
 - b. Fit the pieces as tightly as possible
 - c. Make the pieces $\frac{1}{4}$ inch undersize
 - d. Tape seams generously
- 1-4. In finishing drywall, you must apply paper tape over the joints in order to
- a. reinforce them
 - b. avoid buckling
 - c. conceal fasteners
 - d. prevent cracking
- 1-5. In metal stud drywall, wood is often used
- a. to make toe and top plates
 - b. when the finish will be plaster
 - c. to line rough openings
 - d. when you have no drywall screws
- 1-6. Plywood and hardwood panels should be unwrapped and allowed to stand before use so that
- a. they can settle
 - b. they can adjust to moisture conditions
 - c. you can match grains for the best effect
 - d. you can decide how to fit them together
- 1-7. Which of the following statements about solid lumber paneling is not true?
- a. It must fit neatly and tightly
 - b. It is made of end-notched lumber
 - c. It comes in a wide range of colors
 - d. Panels are usually installed horizontally
- 1-8. What type of nails should you use for lath that will be covered by plaster?
- a. Serrated nails
 - b. Steel-cut nails
 - c. Blued or galvanized nails
 - d. Casing or finish nails
- 1-9. When applying paneling to masonry walls, you must use
- a. casing or finish nails
 - b. special adhesives
 - c. drywall screws
 - d. furring strips
- 1-10. Which material would you use to construct a ceiling that dampens sound?
- a. Suspended tile
 - b. Plasterboard
 - c. Acoustical tile
 - d. Any of the above

SUMMARY

Depending on the job specifications, carpenters have a wide choice of attractive, durable materials for finishing interior walls. Drywall is the most common. It requires careful, accurate taping and cementing. Other surfacing materials for walls are: prefinished and plywood paneling, solid lumber paneling, and plastering. Economy and efficiency have made metal stud drywall systems increasingly popular in building construction.

The materials most often used for finishing ceilings in frame buildings are plasterboard, acoustical tile, and suspended tile. You can apply plasterboard directly to the undersides of floor or roof joists.

Dropped plasterboard ceilings are frequently specified to conceal overhead pipes and unsightly mechanical equipment. Acoustical tiles, interlocked by flanges and grooves, are fastened to furring strips. Suspended ceilings require a more elaborate support system.

Special fasteners and equipment are available for installing both wall and ceiling materials. As a carpenter, you should be familiar with all of them. Take special note of the patterns and modules of the material you are applying. Use good judgment so that the interior will show a high degree of symmetry and uniformity.

Answers to Self-Check Quiz

- | | | | |
|------|--|-------|---|
| 1-1. | d. Any of the above. Ref: 1.03 | 1-6. | b. They can adjust to moisture conditions. Ref: 1.33 |
| 1-2. | a. Wallboard adhesives. Ref: 1.10 | 1-7. | d. Panels are usually installed horizontally. Ref: 1.40 |
| 1-3. | c. Make the pieces $\frac{1}{4}$ in undersize. Ref: 1.12 | 1-8. | c. Blued or galvanized nails. Ref: 1.48 |
| 1-4. | d. Prevent cracking. Ref: 1.20 | 1-9. | d. Furring strips. Ref: 1.51 |
| 1-5. | c. To line rough openings. Ref: 1.29 | 1-10. | c. Acoustical tile. Ref: 1.56 |

Contributions from the following sources are appreciated:

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|--------------|---|
| Figure 1-1. | Georgia-Pacific Corporation |
| Figure 1-4. | United States Gypsum, photo by Hedrich-Blessing |
| Figure 1-6. | Gold Bond Building Products |
| Figure 1-7. | United States Gypsum, photo by Hedrich-Blessing |
| Figure 1-11. | United States Gypsum, photo by Hedrich-Blessing |
| Figure 1-13. | The Celotex Corporation |
| Figure 1-14. | The Celotex Corporation |