

Floors and Floor Care Equipment

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PREVIEW
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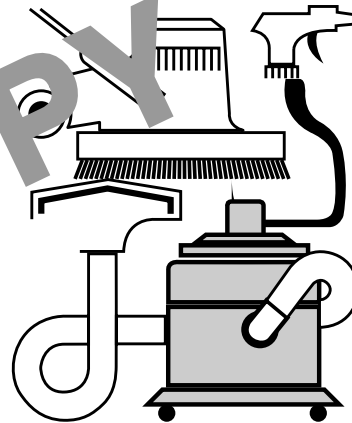
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FLOORS AND FLOOR CARE EQUIPMENT

Lesson One

Kinds of Flooring

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TPC Training Systems

45201

Lesson**1*****Kinds of Flooring*****TOPICS**

Flooring
Resilient Flooring
Natural Hard Flooring

Synthetic Hard Flooring
Wood Flooring
Special Floorings

OBJECTIVES

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

- Tell how to identify the common resilient floorings, and explain the characteristics of each.
- Name the common natural hard floorings, and explain the characteristics of each.
- Explain how synthetic hard flooring is formed and installed.
- Explain why wood floors must be cleaned with care.
- List the main features of cork flooring.
- Explain where and why iron and steel, conductive, and pedestal floors are used.

KEY TECHNICAL TERMS

Flooring 1.01 material that covers the floor
Resilient 1.02 capable of recovering from strain or pressure without being permanently deformed
Asphalt 1.04 mixture of synthetic fibers, lime rock, mineral fillers, and coloring
Porous 1.15 filled with pores; capable of absorbing liquids
Linoleum 1.20 resilient floor covering made with linseed oil, resins, colorings, and cork or wood

Concrete 1.24 heavy-duty material made from water, portland cement, sand, and gravel
Terrazzo 1.28 mosaic flooring made by embedding marble or rock chips in cement
Mastic 1.38 mixture of asphalt, portland cement, and finely crushed stone
Parquet 1.53 patterned hardwood flooring

Before you clean a floor, you must know what kind of floor it is—vinyl, concrete, wood, or some other material. Each is cleaned in a different way. Sometimes you have to clean two floors covered by the same kind of flooring in different ways because of the different kinds of dirt on them or because they are located in different parts of a building. It is your job to make sure that the floor looks good, lasts as long as possible, and is safe to walk on.

When you complete this Lesson, you should be able to identify the different kinds of flooring used in all kinds of buildings today, including the flooring you have in your building. And you will be ready to learn how to care for each type of floor—information that is covered in later Lessons in this Unit.

Flooring

1.01 A *floor* is the base of a room, set apart by walls. *Flooring* covers the floor, and is the material on which people walk. Carpeting can be considered flooring, but is covered in another Unit in this Course. In this Unit, four categories of flooring will be discussed:

- resilient
- hard
- wood
- special.

Resilient Flooring

1.02 *Resilient* flooring is a floor covering that feels slightly “cushiony” when you walk on it. Resilient flooring comes in two forms—tile and sheet. *Tile* usually comes in pieces that are either 9 in. squares or 12 in. squares. *Sheet* flooring comes in the form of large sheets of material. One sheet either covers the floor completely or, if the floor is very large, two or more sheets are used to cover it. If a floor is covered with sheet flooring, you see just one or two long seams where the sheets meet. If a floor is covered with tiles, you see many cracks or seams where the tiles meet each other.

1.03 The four main types of resilient flooring are:

- asphalt
- rubber
- vinyl
- linoleum.

1.04 *Asphalt tile* is harder than most resilient tile, and also noisier underfoot. It is a mixture of fillers, binders, and color. Filler materials can include synthetic fibers, ground wood or limestone, and mineral fillers, such as asbestos. The material that binds the mixture together is either asphalt or resin. The tiles that have asphalt as a binder are usually dark in color. Because the pattern and color run throughout the tile, you will notice little or no color change as the tile wears. You will find asphalt tiles in both 9 and 12 in. squares. When cared for properly, asphalt tile floors can last 15 years or longer.

1.05 Asphalt tile is very brittle, and will break or crack if something hard is dropped on it. Heavy concentrated weights—like the tips of furniture legs—will make dents in asphalt tile. When dry, asphalt tile is not slippery to walk on, but it can become slippery when wet. Largely as a result of these disadvantages, asphalt tile is no longer manufactured. You will, however, be likely to find it in use in many older buildings.

1.06 Although asphalt tile is resistant to most diluted acids and to mild alkaline detergents, a neutral synthetic detergent is best for cleaning asphalt tile floors. Avoid strong alkaline detergents or soaps that contain a lot of lye or caustic soda on asphalt tile. Although asphalt tile itself is resistant to water, you should use as little water as possible when scrubbing it. Remove the water right after scrubbing. If too much water seeps into the seams between the tiles, it will loosen the tiles from the floor and leave stains on the tiles.

1.07 Alcohol, oils, greases, and solvents can seriously harm asphalt tile, causing it to lose its color and soften. Some tiles might even have to be replaced. Solvents (such as kerosine, paint thinner, or mineral

spirits) also can cause the tile colors to bleed. *Bleeding* means that the colors run into each other and ruin the look of the floor. For this reason, you should never use solvent-base coatings or cleaners on asphalt floors. Instead, use water-base coatings. Never use hot water, or place hot objects on asphalt tile, because it softens when heated. Use only cool or lukewarm water to clean it. And be sure to clean up all spills immediately. Paint, varnish, or lacquer will ruin the floor by dissolving the tile. When dry mopping, a wax-base dust treatment is best. An oil-base treatment can attack the floor if not used properly.

1.08 When properly cared for, asphalt tile is resistant to normal abrasive wear (foot traffic). But it is less durable than other kinds of resilient flooring. Gritty dirt—such as that tracked in from a cinder path or driveway—can badly damage its smooth surface and cut years off its useful life. For the same reason, never use sweeping compounds containing sand. Unless you care for asphalt floors properly, they will show traffic lanes and will have a dull surface even after cleaning and refinishing.

1.09 Some older or abused asphalt tile floors develop a roughness and white cast. This look is usually the result of the asbestos used as a filler. Because some asphalt tiles do contain asbestos, never dry buff or sand them. These procedures can cause the asbestos to become airborne and hazardous to your health and that of other building occupants.

1.10 *Rubber flooring* is made of natural and/or synthetic rubber, mineral fillers (such as clay), oils, waxes, colorings, and sometimes asbestos. It is available in both tile and sheet form, and comes in a marble pattern and in many colors. Like asphalt tile, the pattern and color of rubber flooring run all the way through the material. Rubber flooring is waterproof, flexible, alkali-resistant, abrasion-resistant, and almost stainproof. It resists mold and germ growth. Its outstanding features are its shininess, durability, and resilience. It is comfortable underfoot and reduces the noise of foot traffic. It is the least slippery of any smooth-surface floor covering, but can be somewhat slippery when wet.

1.11 Natural rubber flooring is ruined by oils, greases, solvents, strong soaps, and strong alkalis. Soaps and alkalis first make the tile soft and sticky.

Fig. 1-1. Vinyl composition tile floor in hallway



When it dries, it becomes hard and brittle, and cracks appear all over its surface. Solvents, oils, and greases not only soften natural rubber, but cause it to swell and bleed. Synthetic rubber tile will withstand solvents, oils, and greases, however.

1.12 Rubber flooring should never be used in areas that receive direct sunlight. Heavy objects will cause dents in rubber flooring just as they will in asphalt tile. Hot objects will soften the rubber also. But you can scrub rubber flooring with cool or lukewarm water over and over without harming it. With normal wear and good care, rubber flooring can last up to 25 years.

1.13 *Vinyl composition tile* is much like asphalt tile in its makeup, except that vinyl resins and plasticizers are used as the binder, instead of asphalt or plain resins. These binders make vinyl composition tile, shown in Fig. 1-1, more resistant to abrasion, chemicals, and solvents. This type of flooring comes in both 9 in. and 12 in. squares and in many colors, combinations of colors, and patterns. Its pattern and color run all the way through the tile. Vinyl composition tile is more flexible than asphalt tile. Like asphalt tile, it will dent if heavy weight is placed on it. It is quieter to walk on than asphalt tile, but noisier than rubber tile.

1.14 Vinyl composition tile was, at one time, referred to as “vat” tile, for “vinyl asbestos tile.” Tile containing asbestos is no longer manufactured or used in new construction. It is possible, however, that you will encounter it in older buildings. The vinyl composition tile in use today is sometimes referred to as “vct.”

1.15 Vinyl composition tile is *porous*—it has many tiny holes in its surface. This characteristic makes it less water-resistant than rubber tile, but more water-resistant than asphalt tile. You still should not use too much water when scrubbing vinyl composition tile, though, or water seeping between the tiles will cause damage. Vinyl composition tile is resistant to oils, greases, acids, and alkalies. Solvents will cause softening and bleeding, however. This tile wears well under normal foot traffic conditions, but will not hold up to heavy wear, such as in production areas in factories. Vinyl composition tile is not slippery when it is dry, but it can become slippery when it is wet.

1.16 A major problem with vinyl composition tile is that it is easily damaged by cigarette burns. Typical burn removal methods generally do not work well on this kind of tile. The only way to remove the burn is to also remove some of the tile surface. Not only does this look bad, but if the tiles contain asbestos, it can be hazardous. Never sand, buff, or attempt to remove vinyl asbestos floor tiles yourself. Get professional assistance to avoid exposing yourself and others to the hazards of airborne asbestos.

1.17 *Solid vinyl* (sometimes called *pure vinyl* or *100% vinyl*) is similar to rubber flooring. It has less inert filler and pigment than rubber, and its binder is a vinyl resin. It is available in both tile squares and sheet form. Sheet vinyl usually comes in 6 ft wide sheets that might or might not have a backing. The sheets can be welded at their seams to produce a flooring that appears seamless, like the one shown in Fig. 1-2. Solid vinyl seamless flooring resists water seepage and germ growth.

1.18 Solid vinyl flooring comes in many colors and patterns. Some have colored chips mixed in them. Solid vinyl is not quite as resilient as rubber, but its resistance to indentations is good. Some solid vinyl is very quiet to walk on, while other types are just as noisy as vinyl composition tile. Solid vinyl is much more flexible than vinyl composition tile. Its resistance to weak acids, alkalies, and most common chemicals is good. It is very resistant to oils, greases, and solvents.

1.19 Like vinyl composition tile, solid vinyl is not slippery. However, it can be marred by cigarette burns in the same way that vinyl composition tile can.

Fig. 1-2. Solid vinyl seamless flooring



Constant foot traffic will dull the original shiny surface of solid vinyl, especially in traffic lanes, which become marked with small scratches. The scratches then pick up black rubber from the soles and heels of shoes, and become dirty looking. Daily sweeping or dust mopping will prevent many of these scratches. You can restore the gloss by using very fine abrasive pads, as you will learn in later Lessons. The use of floor finish will make all vinyl flooring last longer and look better.

1.20 *Linoleum* was the very first resilient flooring made. It was first sold in England around 1864. Although it has largely been replaced by longer-wearing and easier-to-maintain materials, you might still find it in use in older buildings. Linoleum is a mixture of linseed oil, resins, colorings, and ground cork or wood, pressed on a burlap backing. It usually comes in sheets 6 ft wide, and in many colors, patterns, and designs that go all the way through its thickness. It is more resilient than asphalt tile, vinyl composition tile, or wood, and will not show permanent dents from weight or sudden impact. But a sharp edge or point can cut through a sheet of linoleum.

1.21 Linoleum is quiet to walk on, and resists shrinking, oils, and greases. But it can be damaged by acids, strong alkalies, and water. If you do not immediately remove the water you use to scrub it, linoleum will absorb the water and become soft. Then it will not resist dents and abrasion. It also will begin to pull away from the floor and its edges will curl. Strong alkaline cleaning solutions will attack linoleum, and cause it to become brittle and crack. You must seal the

Fig. 1-3. Concrete floor surface



pores of linoleum flooring to protect it against wear, to prevent it from absorbing water, and to keep dirt from sticking to its surface.

1.22 Linoleum is not slippery, except when too much floor finish builds up on its surface. Cigarettes can burn the surface. However, with proper care, linoleum can last for many years.

Natural Hard Flooring

1.23 The harder the flooring, the better it stands up to foot traffic. Hard floorings are more durable and more resistant to stains, solvents, acids, and alkalis than resilient floorings. Natural hard floorings come in many colors, patterns, textures, and designs. The main types are:

- concrete
- terrazzo
- marble
- ceramic tile and quarry tile
- brick.

1.24 *Concrete floors* are a mixture of water, portland cement, sand, and gravel. Concrete is a heavy-duty material that is used when the floor must be able to withstand a lot of heavy traffic. It is the most popular kind of floor for use in factories where heavy machinery requires a solid foundation. Color sometimes is added to the concrete before it is poured to make it look better.

Fig. 1-4. Terrazzo panels separated by strips



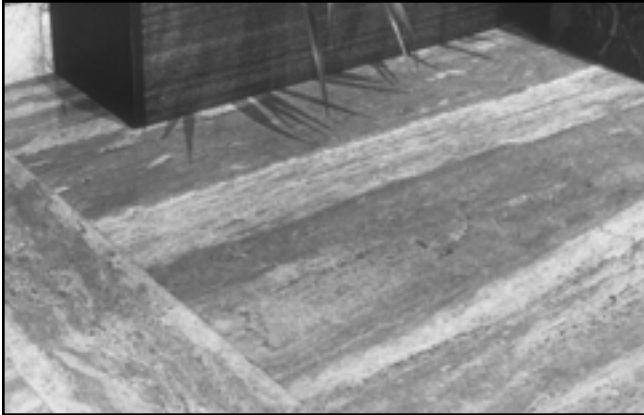
1.25 A concrete floor, such as the one in Fig. 1-3, is extremely hard and noisy to walk on. It resists most chemicals, mineral oils, and greases, but not acids, vegetable oils, fats, or sugar solutions. Such substances will attack the concrete and break it down. Most concrete floors, if clean and dry, are not slippery.

1.26 One problem with concrete floors is that they give off dust that can be harmful to machinery, parts assembly, finished products, and even people's health. Loose dust particles (called *dusting* or *powder*), when ground into the concrete floor by foot traffic, create more dust. Concrete floors require a sealer to prevent dusting.

1.27 Concrete floors are also porous, which means that they will absorb water. Do not use strong soaps and alkalis on them, because these solutions can cause the concrete to chip. They also will remove the sealer. You will learn more about how to care for concrete floors in later Lessons.

1.28 *Terrazzo* is a mixture of marble or rock chips and cement. Colors often are added to the mixture to produce designs and patterns. You will find terrazzo in two forms—precast (sometimes called *terrazzo tiles*), and poured into panels separated by metal, plastic, or rubber strips, as shown in Fig. 1-4.

1.29 A terrazzo floor is very smooth and easy to care for. Although it is noisy to walk on, it is very durable under heavy foot traffic. Unless it is polished too highly, terrazzo is not very slippery. Terrazzo also resists water, but acids or strong alkalis can cause pitting (holes) in the surface. Pitting can be removed only by grinding the surface.

Fig. 1-5. Marble laid to form pattern in lobby

1.30 *Marble* is a polished natural stone. It usually is laid in rectangles, triangles, or squares to form a design, as shown in Fig. 1-5. Marble is very hard, and comes in many grades and colors. It is noisy to walk on, but is not slippery unless it is wet—then it becomes very slippery.

1.31 Like terrazzo, marble resists water. But acids can ruin the polished surface, or even eat a hole in the marble. Harsh alkalis will cause the surface to break down into dust. Only a specialist can restore the surface if marble breaks down. You can ruin or discolor marble by poor care. You will learn how to give marble good care in later Lessons.

1.32 *Ceramic tiles* and *quarry tiles* are made from a mixture of clay and water that is placed in a mold and baked until it becomes hard. The size of the tile is the main difference between ceramic tile and quarry tile. Ceramic tile, shown in Fig. 1-6, is small—usually from 1 to 4 in. square. Quarry tile, shown in Fig. 1-7, is much larger—usually 6 in. square. Both types of tile come with a flat (not shiny) surface. Ceramic tile, however, can also come with a smooth, shiny surface called *glaze*. Glazed ceramic tile is made in many different colors, and can be laid in endless patterns. Unglazed ceramic tiles and quarry tiles come in many earth-tone colors, but are often a reddish-brown color like brick.

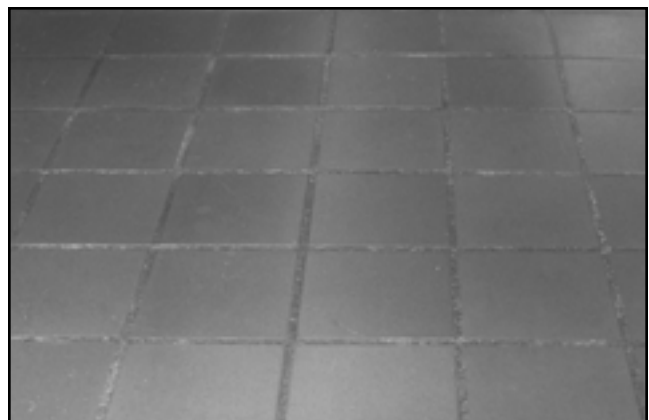
1.33 Both ceramic and quarry tiles are held together by a cement mixture. A small amount of the mixture shows in the joints between the tiles. These lines of cement mixture are called *grout*. Both kinds of tile are very hard, and noisy to walk on. Both are very

Fig. 1-6. Ceramic tile flooring in locker room

1.34 Both ceramic and quarry tiles are very resistant to water, stains, greases, oils, and many chemicals and acids—but the grout is not. Because these floors are very slippery when wet, be sure to keep them dry and safe to walk on. Do not use any cleaner on ceramic or quarry tile flooring that you would not use on concrete flooring. Harsh cleaning solutions will eat away the grout that holds the tiles in place.

1.34 Both ceramic and quarry tiles are very resistant to water, stains, greases, oils, and many chemicals and acids—but the grout is not. Because these floors are very slippery when wet, be sure to keep them dry and safe to walk on. Do not use any cleaner on ceramic or quarry tile flooring that you would not use on concrete flooring. Harsh cleaning solutions will eat away the grout that holds the tiles in place.

1.35 *Brick* used for flooring also is usually made from clay. The bricks are laid either flat or on edge to form a pattern, like the one in Fig. 1-8 on the following page. Bricks are held together by *mortar* (visible

Fig. 1-7. Quarry tile on kitchen floor

strips of cement mixture that are wider than strips of grout). Brick floors are noisy to walk on, but they are very durable, resist heavy weights and dents, and are easy to care for. Like clay tiles, bricks used for flooring are very resistant to water, stains, greases, oils, and many chemicals and acids—but, again, the mortar is not. The lobbies of some buildings have floors made from common or used brick. These two kinds of bricks are very porous, and easily stained by oils, greases, and chemicals. Do not use harsh cleaning solutions on any brick floors because they will eat away the mortar. Some brick becomes slippery when wet.

The Programmed Exercises on the next 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 the book. Read the instructions printed on the Reveal Key. Follow these instructions as you work through the Programmed Exercises.

Fig. 1-8. Brick floor laid to form a pattern



PREVIEW
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<p>1-1. Resilient flooring comes in two forms: _____ and _____.</p>	<p>1-1. TILE; SHEET Ref: 1.02</p>
<p>1-2. Never sand asphalt tiles because they might contain _____.</p>	<p>1-2. ASBESTOS Ref: 1.09</p>
<p>1-3. Is vinyl composition tile more or less resistant to abrasion, chemicals, and solvents than asphalt tile?</p>	<p>1-3. MORE Ref: 1.13</p>
<p>1-4. Which are more resistant to stains, hard floorings or soft floorings?</p>	<p>1-4. HARD FLOORINGS Ref: 1.23</p>
<p>1-5. One problem with concrete floors is that they give off _____.</p>	<p>1-5. DUST Ref: 1.26</p>
<p>1-6. What flooring is a mixture of marble chips and cement?</p>	<p>1-6. TERRAZZO Ref: 1.28</p>
<p>1-7. What flooring is made from a polished natural stone?</p>	<p>1-7. MARBLE Ref: 1.30</p>
<p>1-8. The cement mixture that holds ceramic and quarry tiles together, and forms lines between the tiles, is called _____.</p>	<p>1-8. GROUT Ref: 1.33</p>

Synthetic Hard Flooring

1.36 Synthetic hard floorings sometimes are referred to as *poured floors* or *formed-in-place* floors, which is an exact description of how they are made. This seamless flooring is “formed in place” when the floor is first built by pouring or spraying a material onto the sub-floor. The material either levels itself into a flat surface, or the surface is smoothed by troweling or grinding.

1.37 Concrete floors and terrazzo floors are actually made in this same way, even though they are not classified as seamless floors. Only floorings made from synthetic materials are called “seamless.” The oldest seamless floors are magnesite and mastic, which have been used for many decades. Beginning in the late 1950s, several other synthetic materials came into use as seamless flooring:

- epoxy
- polyester
- polyurethane
- silicone.

These four, plus mastic and magnesite, make up the category called seamless floors.

1.38 *Mastic* floors are made from asphalt, portland cement, and crushed stone. Mastic makes a good floor for warehouses and docks. Special grades are available for specific uses and locations, such as dairies, slaughterhouses, and buildings where sparks can cause fires or explosions (flour mills, for example). Mastic floors are usually black, red, or brown. Their hardness varies with the grade. Most grades show dents left by heavy loads.

1.39 Hard mastic floors are noisier to walk on than the softer grades. All grades resist abrasion and heavy traffic, and are very durable. But they can be seriously harmed by solvents, oils, fats, greases, and other liquid hydrocarbons. These materials soften the mastic, leaving a rough and porous surface. Average grades are attacked by acids, but resist alkaline solutions at normal temperatures. Mastic floors are waterproof, odorless, and dustless. They are not normally slippery, but can become slippery when wet.

1.40 *Magnesite or oxychloride* floors are made from sawdust and crushed stone bound together with magnesium oxychloride cement. They are used in factories, public buildings, schools, hospitals, and hotels. Magnesite floors vary in how hard they are and how they look, depending on their exact makeup. They are usually a dark red or black color, and can look like concrete or mastic floors. But magnesite floors are smoother than concrete, and have no seams like the dividing grooves used in concrete to keep it from cracking.

1.41 You must be able to tell the difference between mastic floors and magnesite floors, because they are cared for in very different ways. First, clean a small area with a solution of neutral detergent in water. Then pour a little kerosine, paint thinner, or mineral spirits onto a cloth, and rub the clean area. If the floor is magnesite, the solvent will have no effect. If the floor is mastic, it will soften slightly and bleed—the color will show up on the cloth.

1.42 Magnesite is strong, durable, flexible, non-combustible, and resistant to oils, greases, and fats. Magnesite floors tend to be noisy to walk on. They resist abrasion and dents caused by heavy objects placed on them. But any spilled acids will destroy or permanently scar magnesite floors. Strong alkaline cleaners will also damage the surface of a magnesite floor. Be careful not to use too much water when cleaning magnesite floors. They will absorb the water and develop cracks, crumble, or even lift up from the subfloor. Magnesite can become slippery if not cared for properly.

1.43 *Epoxy* floors, like the one shown in Fig. 1-9, are made from epoxy resin and a hardener. Epoxy resins are *thermosetting* materials, which means that they are produced by a chemical reaction and cannot be melted and rehardened without destroying them. Epoxies are durable—often stronger than concrete—and are resistant to heavy traffic and dents. They also resist alkalies, oils, fats, greases, and most solvents and mild acids. They are fairly hard and nonporous. Depending on how they are made, they can be either noisy or quiet to walk on. Epoxy floors are often a dark color—red, green, gray, or brown. Some are clear, some are light-colored, and some are multicolored. Epoxy floors are dustless and easy to care for. But they are slippery when wet.

Fig. 1-9. Epoxy floor in cafeteria



1.44 *Polyester* floors, like epoxy floors, are made from thermosetting resins. Polyester floors are non-porous, stainproof, and suitable for locations where sanitary flooring is required. They are resistant to mild alkalies, oils, fats, greases, and most chemicals. Polyester floors will not crack, pit, or scratch, even under hard use. However, they can be damaged by most acids and solvents. Polyester floors are dustless, and require no care other than routine wet cleaning. They are not slippery to walk on.

1.45 *Polyurethane* is another flooring material made from thermosetting resins. It is resilient, resistant to mild alkalies, oils, fats, greases, stains, solvents, and most chemicals—particularly acids. Polyurethane is dustless, easy to care for, and not naturally slippery. Polyurethane floors come in many colors, color combinations, and surface textures. They are very durable, and are very resistant to scuffing, scratching, and dents. You can recoat polyurethane floors from time to time to extend their service life.

1.46 *Silicone* floors are made from resins, urethane, and a specially treated crushed stone. The mixture produces a surface texture similar to concrete. Silicone is used mainly to cover and seal concrete floors that have been damaged by water or acids, or by structural movement. It is a flexible flooring that resists wear, abrasion, and water. However, silicone is not very resistant to chemicals, and can be cut upon impact.

Wood Flooring

1.47 Wood flooring has been used for many centuries. Some wood floors that are hundreds of years old are still giving good service. Wood is hard, resists wear, has good resilience, is not very slippery (depending on its finish), and is easy to care for. The natural beauty of wood makes it worthy of the best care that you can give it. With poor care, wood will not keep its good looks and will not last as long as it should.

1.48 The timber cut from trees is divided into two types—*softwoods* and *hardwoods*. Early flooring was mostly softwood, both because the supply was plentiful, and because softwood was easy to work with using hand tools. It was usually laid in planks of varying widths. Softwood does not resist abrasion or dents as well as hardwood does. Therefore, when lumbering equipment and seasoning methods improved, hardwood began to replace softwood as flooring. Modern industrial and commercial wood floors are almost always hardwood. It wears longer and more evenly and resists abrasion better than softwood. It also withstands heavy traffic over long periods of time.

1.49 All wood floors must be cleaned with care. Wood is porous, and water will cause it to swell, deteriorate, and lose its color. Wood also will lose its color from contact with acids, alkalies, and many chemicals.

1.50 The four types of wood flooring that you will find most often are:

- strip
- board
- vertical wood block
- parquet.

You need to know about each of these types in order to understand and choose proper methods of care.

1.51 Hardwood *strip* and *board* floors are assembled from strips that are 4 in. wide, or from wider boards. Strip flooring is usually attached to the sub-floor, wooden bearers, or joists by concealed nailing.

In this method, shown in Fig. 1-10, nails are driven at about a 50° angle through the strip just above the tongue. Board flooring is usually attached in the same way, except that more nails are driven through the face of the wood. Screws are often used instead of nails on boards wider than 7 in.

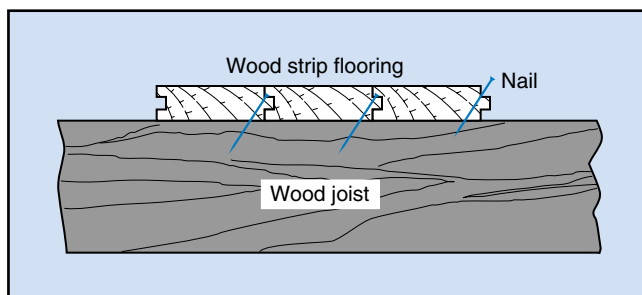
1.52 *Vertical wood block or end-grain block* is made from softwood in blocks that are usually 3 by 9 in., and 2½ to 4½ in. thick. They are laid on end, so that the grain of the wood is vertical, which makes them extra strong and enables them to withstand the very heavy traffic in workshops and factories. Vertical wood blocks are usually attached to concrete with pitch, or grouted with an asphalt mixture to hold them in place.

1.53 *Parquet or wood block floors* are made from hardwoods arranged in a pattern, as shown in Fig. 1-11. Many designs and block or strip sizes are used. Blocks are usually laid on a concrete base or a rough wood subfloor and attached with a mastic or asphalt mixture. Sometimes pre-arranged parquet sections are glued to a smooth even floor or attached by panel pins. Like hardwood strip flooring, parquet strips are joined with tongues and grooves and fastened to a subfloor with concealed nailing.

Special Floorings

1.54 **Cork flooring.** Cork floors come mainly from the outer bark of the cork oak tree that grows in Spain and Portugal. The bark curlings and ground-up cork are baked and pressed in molds to produce both tiles, as shown in Fig. 1-12, and sheets. Resin binders hold the cork together. Cork comes in three shades of brown. Many patterns can be made from two or three of the shades. Cork flooring is dustless, very resilient, and very porous. It is very quiet to walk on, and is not slippery.

Fig. 1-10. Concealed nailing secures wood strip floor to joist



1.55 Cork is very soft, however, and will not withstand heavy traffic. Tracked-in dirt, cinders, or other abrasive materials will roughen the cork surface and cause rapid wear. Cork also dents easily and will discolor from greases, oils, and other soil. The fact that natural cork is porous makes it difficult to care for, because cleaning solutions can soften the cork and cause it to swell and crumble. Both water and alkaline detergents can ruin cork flooring if you do not use them carefully.

1.56 Three types of factory-finished cork floorings are less porous than natural cork:

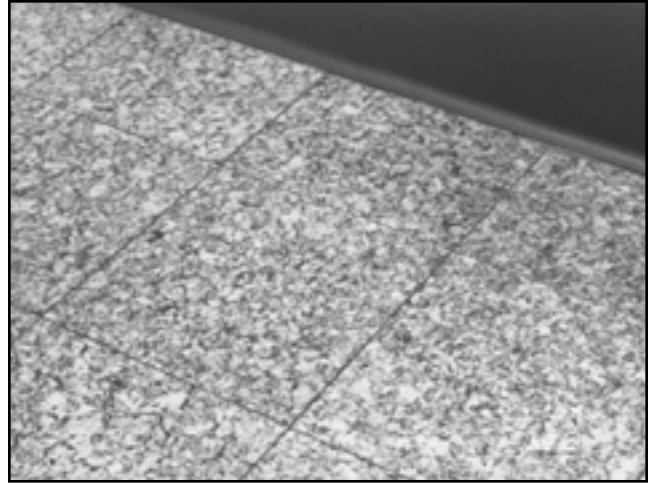
- waxed cork
- resin-reinforced waxed cork
- vinyl cork.

Waxed cork is sealed with a melted wax so that it does not require finishing when installed. *Resin-reinforced waxed cork* is sealed with a wax mixed with resin to make it less porous, smoother, and less likely to be damaged by dirt. *Vinyl cork* has a vinyl coating bonded to its surface to resist both stains and dirt. This type of cork requires almost no maintenance. In fact, you should never sand, seal, polish, or buff it.

1.57 **Iron and steel floorings.** Iron and steel floorings are often used in factories where floors get very heavy traffic, particularly where a dust-free floor is required. Both iron and steel are a dull metal color, and noisy to walk on. They are very durable, resist abrasion and dents, and cannot be damaged by oils, greases, or weak acids and alkalis. Both can be attacked by strong acids, however. You can find these floorings in four main forms:

- tiles (solid or backed with concrete)
- solid plates
- open grid
- fine mesh.

1.58 *Tiles* can be studded, ribbed, or have a plain surface. They are usually 12 in. square, and are often used in food factories where standards of cleanliness are high.

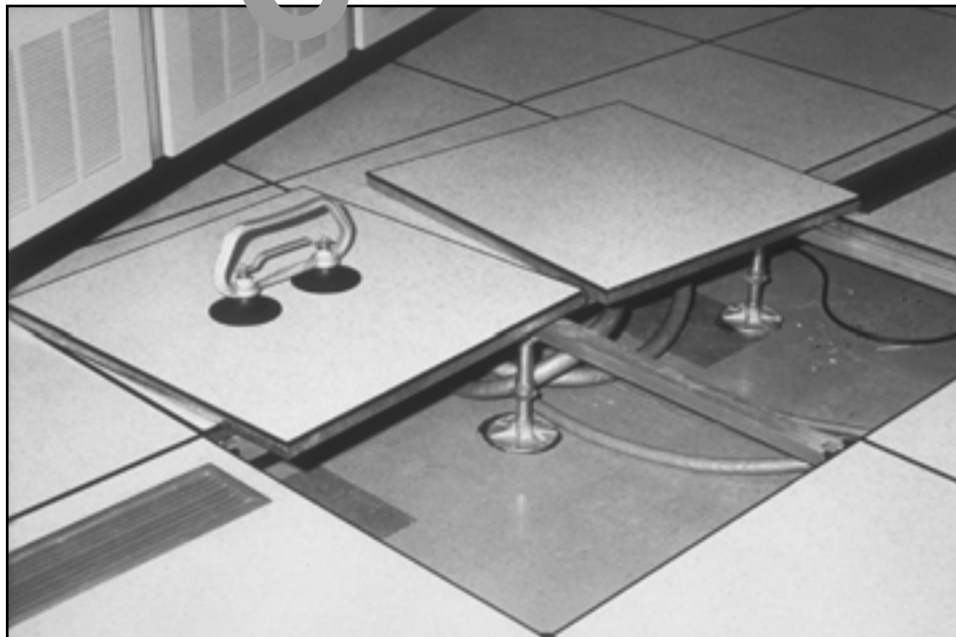
Fig. 1-11. Parquet floor in office lobby**Fig. 1-12. Cork floor laid in tiles**

They tend to corrode (rust) when wet. They are not slippery normally, but become slippery if oily or wet.

1.59 *Solid plates* are used in metalworking plants where heavy objects can be dropped or hot metal spilled on the floor. Bakeries, breweries, and dairies often have solid iron- or steel-plate floors because of the heavy traffic that their floors must withstand and the germ-free requirements that they must meet. Solid-plate floors become slippery if oils, greases, water, or any other liquid stand on their surfaces.

1.60 *Open-grid* and *fine-mesh* floorings often are used as suspended or raised platforms in chemical plants, as walkways in metalworking plants, and for fire escape stairways. The main problem that you will encounter in caring for these floorings is that dirt and soil can fall through them onto people or machinery below.

1.61 **Conductive flooring.** *Conductive floorings* (also called antistatic floorings) are floorings that absorb and conduct electricity. Conductive floorings are used in areas where electricity could cause

Fig. 1-13. Space between subfloor and pedestal (raised) floor

people to get an electric shock, or a spark of electricity could cause an explosion or fire. Conductive floors are frequently used in hospitals, chemical plants, petroleum cracking plants, flour mills, and some factories.

1.62 Conductive floorings can be made from materials such as terrazzo, magnesite, ceramic, rubber, vinyl, vinyl composition, stainless steel, or linoleum. These special floorings are much like the ordinary ones made from the same materials. But they are usually darker in color, because carbon (which is black) is added to make them absorb and conduct electricity better. However, just by looking at them, you cannot tell if they are conductive. Ask your supervisor.

1.63 Conductive floors are not always as durable as ordinary floors, and you must be sure to keep oils, greases, waxes, and similar materials off of them. Conductive floors require different care than any other kind of floor, as you will learn in later Lessons. Good care of these floors can actually

mean the difference between life and death to someone.

1.64 **Pedestal floors.** Computer rooms sometimes require *pedestal* floors. These are floors that are raised above the subfloor. The space between the subfloor and the raised floor, shown in Fig. 1-13 on the previous page, is for the wires and cables that connect the computers. Air also passes through this space to cool the computers. Electrostatic charges—which can be removed by frequent mopping—must not be allowed to form on these floors, because they can cause damage to computers.

1.65 Pedestal floors are made from tiles. The tiles can be made from any of the materials named in paragraph 1.62. Each tile has a 1 in. wood backing and sits on metal legs that keep it as much as 1 ft above the subfloor. Unlike ordinary tiles, these tiles are not attached to each other with grout or cement, as you can see in Fig. 1-13. The surface of a pedestal floor also requires special care. You will learn how to care for pedestal floors in later Lessons.

**PREVIEW
COPY**

18 Programmed Exercises

<p>1-9. Synthetic hard floors are also called _____ floors, which describes how they are made.</p>	<p>1-9. POURED or FORMED-IN-PLACE Ref: 1.36</p>
<p>1-10. What kind of hard flooring often is used for warehouses, docks, dairies, slaughterhouses, and flour mills?</p>	<p>1-10. MASTIC Ref: 1.38</p>
<p>1-11. Which two floors look very much alike but are cared for so differently that you must test them to tell them apart?</p>	<p>1-11. MASTIC and MAGNESITE Ref: 1.40, 1.41</p>
<p>1-12. Name the three synthetic hard floorings that are made from thermosetting materials.</p>	<p>1-12. EPOXY, POLYESTER, and POLYURETHANE Ref: 1.43 through 1.45</p>
<p>1-13. Avoid using too much water on _____ floorings, because it causes them to swell and lose their color.</p>	<p>1-13. WOOD Ref: 1.49</p>
<p>1-14. Name four common forms of wood flooring.</p>	<p>1-14. STRIP, BOARD, VERTICAL WOOD BLOCK, and PARQUET Ref: 1.50</p>
<p>1-15. Two kinds of floors used in heavy-traffic areas requiring a dust-free floor are _____ and _____.</p>	<p>1-15. IRON; STEEL Ref: 1.57</p>
<p>1-16. Floorings that absorb and conduct electricity are called _____.</p>	<p>1-16. CONDUCTIVE Ref: 1.61</p>

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

- 1-1. Resilient tile is usually _____ in. square.
- a. 6 or 8
 - b. 9 or 12
 - c. 10 or 14
 - d. 12 or 15
- 1-2. Solvent causes asphalt tile to
- a. bleed
 - b. chip
 - c. crack
 - d. fade
- 1-3. Vinyl composition tile floors can be permanently marred by
- a. cigarette burns
 - b. dust
 - c. foot traffic
 - d. rubber heel marks
- 1-4. Which kind of floor gives off dust?
- a. Concrete
 - b. Linoleum
 - c. Natural rubber
 - d. Terrazzo
- 1-5. If a floor is made from marble chips and cement, and is hard and smooth, it is called
- a. concrete
 - b. mastic
 - c. seamless
 - d. terrazzo
- 1-6. Ceramic tile differs from quarry tile in its
- a. durability
 - b. makeup
 - c. resistance to stains
 - d. size
- 1-7. Synthetic hard floorings are
- a. formed in place
 - b. held together with resin
 - c. made from hardwood
 - d. tiles grouted together
- 1-8. Floors made from asphalt, portland cement, and crushed stone are called _____ floors.
- a. magnesite
 - b. mastic
 - c. pedestal
 - d. silicone
- 1-9. Natural cork floors
- a. are easy to care for
 - b. can withstand heavy traffic
 - c. come in three shades of brown
 - d. tend to be slippery when wet
- 1-10. Which kind of floor absorbs electricity and is often used in hospitals?
- a. Conductive
 - b. Epoxy
 - c. Parquet
 - d. Polyester

SUMMARY

Four general types of flooring were introduced in this Lesson: resilient, hard, wood, and a “special” category that includes floorings used in specialized environments.

Resilient flooring comes in two forms—tile and sheet. The main types of resilient flooring in general use are asphalt, rubber, vinyl and linoleum.

Hard floors are made from many natural sources, including concrete, terrazzo, marble, ceramic tile, quarry tile, and brick. Man-made materials used for hard flooring include epoxy, polyester, polyurethane, and silicone. These synthetic materials can be poured or sprayed onto a subfloor to form a seamless floor. Mastic and magnesite also belong in the category known as seamless floors.

Most wood flooring is hardwood, which wears longer and withstands heavy traffic better

than softwood. The four main types of wood flooring are called strip, board, vertical wood block, and parquet.

Special floorings include the iron and steel floors often used in factories. They are very durable, resist abrasion, and cannot be damaged by oils or greases. Iron and steel flooring comes in four main forms—tiles, solid plates, open grid, and fine mesh. Conductive floors, which absorb and conduct electricity, are used in areas where electricity could cause people to get an electric shock, or where a spark could cause an explosion or fire. Computer rooms sometimes require pedestal floors. These are floors that are raised above the subfloor. The space between the subfloor and the raised floor is for the wires that connect the computers. Air also passes through this space to cool the computers.

Answers to Self-Check Quiz

- 1-1. b. 9 or 12 in. square. Ref: 1.02
- 1-2. a. Bleed. Ref: 1.07
- 1-3. a. Cigarette burns. Ref: 1.16
- 1-4. a. Concrete. Ref: 1.26
- 1-5. d. Terrazzo. Ref: 1.28,1.29
- 1-6. d. Size. Ref: 1.32
- 1-7. a. Formed in place. Ref: 1.36
- 1-8. b. Mastic. Ref: 1.38
- 1-9. c. Come in three shades of brown. Ref: 1.54
- 1-10. a. Conductive. Ref: 1.61