Readability (Layout)

Dan Wixted

Cornell Cooperative Extension

Pesticide Safety Education Program

What Is Readability?

What Is Readability?

Readability is “the ease with which a reader can successfully decipher, process, and make meaning of the text.” (from readabilitymatters.org)

Depends on the vocabulary and writing style as well as how the text is presented (i.e., layout)

What Is Layout?

“Page layout is the arrangement of visual elements on a page. It generally involves organizational principles of composition to achieve specific communication objectives.”

(O’Connor, Z. 2014. *Elements and principles of design: Tools for digital imagery, art and design*.)

CONTINUED FROM PAGE 26

MOVERS & SHAKERS

Getem Services celebrates 100 years

Norfolk, Va.-based Getem Services is marking its centennial year by winning both the 2022 Norfolk Small Business of the Year as well as the 2022 Hampton Roads Regional Small Business of the year. Pictured below from left are Bryan Stephens, CEO and president of the Hampton Roads Chamber with Carley Church, her father, Charlie, and her brother Chaz Church. Charlie is Getem's third-generation owner, as the company was founded in 1922 by his grandfather, Luther Church, Sr. Luther also founded and was first president of the Virginia Pest Management Association in 1948 – and Charlie served as president in 1998.


Karl Kibodeaux Sr.

• Pasadena, Texas-based **Control Solutions Inc. (CSI)** promoted **Karl Kibodeaux Sr., ACE**, to key accounts manager of the CSI-Pest division.


Paul Griffin


Susan Scott

• **Paul Griffin** and **Susan Scott** joined **PestWest USA** as Eastern regional technical specialist and accounting manager, respectively.


Matt Higley

• **Syngenta** appointed **Matt Higley** as a new territory manager within its professional pest management (PPM) business, for customers in Alabama, Georgia, Mississippi, South Carolina and Tennessee.


Aly Silva Mulgrew

• **Aly Silva Mulgrew** will succeed Stacy O'Reilly, president and owner of **Plunkett's Pest Control**, effective Jan. 1, 2023. O'Reilly will remain chair of the board of directors.


Cheri Michaels

• Jacksonville, Fla.-based **Turner Pest Control**, a division of **Anticimex**, promoted VP of Sales **Cheri Michaels** to president.


Brittany Bailey


James Cooksey

• Cary, N.C.-based **Envu** added three new leaders: **Brittany Bailey** joined as head of marketing, while **James Cooksey** and **Maria Miller** joined as area sales managers for South Florida and the Carolinas, respectively.


Maria Miller

SEED TREATMENT

A National Pesticide Applicator Study Manual

Font Selection

Size: 12 pt minimum

Font Selection

Serif font: Times New Roman, Palatino

Sans serif font: Helvetica, Arial

Font Selection

Serif more common in print publications

- Seems easier to read in long documents

Sans serif more common in digital and PPT

- Seems easier to read on screen or when projected

Justification: Full vs Left

Full Justification (“Justified”)

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Pros:

Looks neat, crisp, symmetric

Gives sense of formality, importance, seriousness

Allows more words per page

Full Justification (“Justified”)

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Cons:

Uneven word spacing:

- Eyes tire more quickly
- Disrupts word “chunks”

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Cons:

Uneven word spacing:

- Eyes tire more quickly
- Disrupts word “chunks”
- Distracting “rivers” in text
- Harder for poor readers

Left Justification (“Ragged Right”)

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Pros:

Even spacing: less eye strain

Fewer hyphens at end of lines

Easier to track where you are

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Pros:

Even spacing: less eye strain

Fewer hyphens at end of lines

Easier to track where you are

Easier to read and recall

Line Length

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Ideal: 52-72 lowercase characters (including spaces and punctuation)

Line Length

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- Longer: Hard to identify which line is next
- Shorter: More eye returns increase eye fatigue

Use of Columns

Inorganic Contaminants

Inorganic substances are categorized together on the basis that they do not contain the element carbon. Naturally occurring minerals and salts are contained in all groundwater. They are dissolved as water passes downward through soil and other subsurface layers. Most of these are not health concerns at normal levels; for example, calcium, potassium and magnesium are important plant and animal nutrients. However, these and other inorganic substances can be harmful when present in high concentrations. Heavy metals such as arsenic, barium, lead and mercury can occur naturally in water at harmful concentrations.

Nitrate is another contaminant of concern. Nitrate is highly soluble and in high concentrations can cause "blue baby syndrome" in infants. Nitrate contamination occurs primarily as a result of human activity. Too much fertilizer on lawns, fields and gardens, locating septic systems too close together, and the mismanagement of animal manures are all activities that can contribute to high nitrate levels in water.

Phosphorous is not as big a problem for water because unlike nitrates it holds tightly to soil particles. It can be carried with eroded soil particles into surface water. Once there, phosphorous stimulates aquatic plants to grow quickly choking ponds, lakes and reservoirs with decaying mats of algae and other plants. The decaying plants consume oxygen, in turn killing fish giving off unpleasant odors.

Synthetic and Natural Organic Chemical Contaminants

Synthetic and naturally occurring organic chemicals have at least one thing in common; they all contain the element carbon. Organic means relating to or containing carbon compounds. Refer to the previous section on inorganic contaminants. These chemicals are used by humans for many purposes, but when they contaminate water, they can cause significant harm. Examples of organic chemicals include cleaning fluids, fossil fuels and pesticides. The presence of these chemicals in water is of great concern because of the health risks that they may pose. Improper use, storage and disposal have resulted in contamination of water with these chemicals.

Fates of Pesticides after Application

A pesticide active ingredient has several possible fates after it has been applied to an outdoor site. Pesticides may be:

- Lost to the atmosphere through volatilization,
- Broken down by sunlight, via a process called photolysis or by water via hydrolysis,
- Taken up by plants,
- Degraded in the soil by natural biological processes,
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- Carried away from the surface by runoff water, and
- Leached through the top layers of soil by recharge water after which

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Carpenter Bees

Like carpenter ants, carpenter bees nest in wood but do not eat it. They are solitary bees, meaning they do not live in colonies like honey bees.

Description

The carpenter bee has a robust and stocky build and is often mistaken for the bumble bee. The major defining characteristic is the top surface of the abdomen is bare black and shiny whereas the bumble bee abdomen is hairy. The body may be 1/2 to 1 inch long.

Wood Infested

Carpenter bees will bore into structural wood such as posts, soffits, fascia boards, exposed joists (e.g., porch overhangs), and decking. While they prefer to bore into exposed wood, painting or staining wood will not provide complete protection from carpenter bees.

Signs of Damage

The behavior of males is quite stark and often a first indication that carpenter bees are nesting in structural wood. A male will hover around the entrance to a gallery and chase off any intruders, including humans (Figure 1-6). Though aggressive in this way, the males are harmless to us because they lack a sting.

Soil Characteristics that Affect Leaching

Soil Texture

Soil texture affects the movement of water through soil. It refers to the proportion of sand, silt and clay that make up the soil. A coarse-textured soil contains more gravel and sand with large pores thus allowing water to move rapidly through it. Furthermore, coarse-textured soils have low tendencies to adsorb organic and inorganic substances. Consequently, substances, including pesticides, carried by water through course textured soil are more likely to reach groundwater. Permeability is the measure of the speed water moves through soil. Coarse soils are highly permeable. In contrast, clay soils have low permeability. A soil containing large proportions of clay and organic matter will hold more water and adsorb more substances from the water slowing the downward movement of substances carried by the water. Slower downward movement of substances increases their vulnerability to factors that result in their degradation.

In summary, groundwater is more vulnerable to contamination in areas where course soils are dominant.

Soil Organic Matter

Soil organic matter provides more surface area for adsorption and serves as a source of carbon, which nourishes microorganisms contributing to their growth. Organic matter content is considered the single most important soil property affecting pesticide adsorption and breakdown by microorganisms.

Adding crop residues, manure and cover crops adds organic matter to the soil. This increases the soils' ability to hold water and degrade pesticides, thus preventing their migration into groundwater.

Soil Structure

Loosely packed soil particles allow speedy movement of water through the soil. Tightly compacted soil will hold water back like a dam, not allowing water to move freely through it. There are several physical processes that create openings and channels for water movement. Burrows, for example, dug by mammals and earthworms create openings for water to move. Freezing and thawing creates fissures or cracks in soil and rock breaking up compacted particles. This permits rapid water movement, even through clay soils. Plant roots penetrate soil, creating excellent water channels when they die and rot away.

Soil Water Content

The amount of water already in the soil has a direct bearing on whether or not a rain or irrigation event will result in the recharging of groundwater. Soils are more likely to be saturated with water in the spring when rain or snow melt occurs. Soluble pesticides or other contaminants are more likely to reach groundwater when soil water content approaches or is at saturation. On the other hand, when soils are dry, the new water just fills the pores in the soil near the soil surface; thus, it is unlikely that this water will reach the groundwater supply. This is most likely to happen in the summer when water use is high and rainfall is low.

Girders, Sills, and Joists	Wooden girders, sills, and joists in or on foundation walls should be placed above the outside grade. If they are not, termites can find hidden access to this wood; furthermore, the wood may be more subject to decay. Floor joists and girders that are boxed in masonry concrete walls should have an air space of at least 1 inch around the sides and ends; because it is difficult to remove these timbers once they are structurally damaged by termites, it is good to use lumber that has been pressure treated with a preservative.
Wood Used in Basements	Wooden basement partitions, posts, and stair carriages should be placed after the concrete floor is poured. They should never extend into or through the concrete; otherwise they are not only subject to attack and damage by termites, but it will be difficult to detect the infestation because the termites will be able to tunnel directly into the wood without forming visible mud tubes. Using reinforced concrete under the wood helps ensure the concrete will not crack and let termites get through from the soil beneath. Concrete footings that extend about 3 inches above the floor level can be used under wood posts, stair carriages, heating units, and load-bearing points. Termite infestations in finished basement rooms are very difficult to detect and control. Not only are sills and joists hidden from view, untreated wood floors and furring strips are often used. Because of the danger of decay, wood screens, subflooring, and furring strips should be made from wood that has been pressure treated with a wood preservative. Termiticide applications to the soil and to any voids in the foundation before and during construction will help prevent infestations (see Chapters 3 and 4).
Water Pipes and Conduits	In crawl spaces, plumbing and electric conduits should be clear of the ground; they should be suspended from girders and joists where possible. Supporting them by wooden blocks or stakes connecting with the ground allows termites to tunnel through these wood supports or construct tubes over them to the sills, floors, and joists above. If plumbing extends from the ground to the wood above, the soil around the plumbing will need to be treated with termiticide. Likewise, soil at the site where pipes or other structural elements penetrate foundation walls or slabs will need to be treated and the opening properly sealed (e.g., with cement). We will discuss how to treat soil in Chapter 3.
Exterior Woodwork	Exterior woodwork that contacts soil or that is near grade level are susceptible to decay and so a builder should use wood that has been

440 Words

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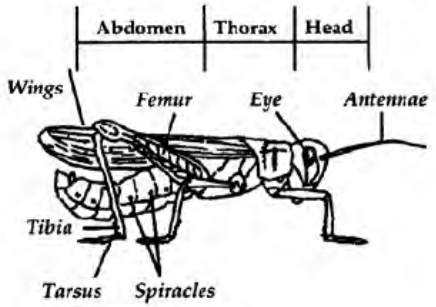
Insects

Insects are invertebrates (animals without backbones) and outnumber all other animals on Earth, so it's not surprising that they are perhaps our biggest pest problem. Because of this, we will go into more detail about insects than other pests.

Adult Insect Body Characteristics

Adult insects have three pairs of jointed legs for a total of six legs. Adult spiders, ticks, centipedes, and millipedes have more than six legs and therefore are not insects.

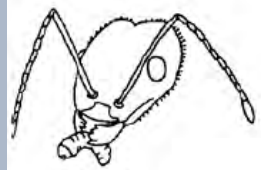
Adult insects also have three distinct body regions: the head, thorax, and abdomen. (However, the separation between the thorax and abdomen is not always easy to see.) Each region is covered by a hard, protective "skin" (called an "exoskeleton") and performs different functions.



Head

The insect head bears mouthparts, eyes, and antennae.

Mouthparts. Mouthparts vary among groups of insects, so you can use them to help identify a pest insect and the sort of damage it does. Therefore, it is important that you are aware of these types of insect mouthparts:



chewing

- Chewing mouthparts have toothed jaws that bite and tear the food. Beetles, cockroaches, ants, and grasshoppers have chewing mouthparts. These insects can cause damage in a number of ways, such as by eating plants, tunneling into structural wood, or chewing holes in fabrics.

Information within a chapter is grouped under headings and subheadings. The appearance of each level of headings remains the same throughout the manual; this format helps you understand how pieces of information are related to others within a chapter. In Chapter 6 ("Preparing Wood for Treatment"), for example, the following headings appear:

- **Reducing the Moisture Content of Wood** is a main, first-level heading.
- Air Drying is a second-level heading because it is one method for reducing moisture content.
- *Factors Affecting Air Drying* is a third-level heading on a specific topic about air drying.
- **Stacking and Spacing** is a fourth-level heading about one factor that affects air drying.

Carpenter Ants

The black carpenter ant is the most common carpenter ant species in the Northeast. They nest in wood but, unlike termites and wood-boring beetles, do not eat wood; rather, they excavate cavities in wood to serve as their nests. As a result, they can nest even in pressure-treated wood. We will discuss carpenter ants in more detail in Chapter 9.

Description

Workers are black and vary in size from about 1/4 to 1/2 of an inch long. The presence of larger workers indicates a long-standing colony. Workers have an evenly rounded thorax and one node between the thorax and abdomen. Winged reproductives are often mistaken for termites; we discussed how to distinguish between them earlier in this chapter.

Wood Infested

Carpenter ants will nest in wood only if it has a high moisture content, preferably greater than 20%; typically, the wood has suffered water damage and has been attacked by decay fungi. Common sites for colonies to develop include tree stumps, tree holes, hollowed tree

Signs of Damage

The behavior of males is quite stark and often a first indication that carpenter bees are nesting in structural wood. A male will hover around the entrance to a gallery and chase off any intruders, including humans (Figure 1-6). Though aggressive in this way, the males are harmless to us because they lack a sting.

Figure 1-6. Carpenter bee and its damage.

The female will bore a hold approximately ½ in diameter into wood and them make a right turn to follow the grain. Piles of very coarse sawdust will form below the tunnel. Carpenter bees will return to the same wood year after year, so a series of large holes in wood is another sign that carpenter bees have been active.

Application

Baits come in several formulations. Liquid (Figure 9-2) and gel baits are sugar baits. Granules, pastes, and liver baits offer protein to ants. Yellow oily baits provide lipids.

Liquids. Liquids come in prebaited stations or can be put into stations. They require some maintenance because of evaporation. As liquid evaporates, the concentration of toxicant in the bait increases. This can result in quicker kill of foragers, thus preventing the spread of bait through the colony. This in turn can cause other foragers to associate the bait with death. They will begin to avoid the bait. You can avoid this problem by replacing bait frequently or by periodically thinning it with water to maintain the original concentration of toxicant if the label allows you to do so.

Figure 9-2. Carpenter ant feeding on liquid ant bait.

What Goes In

The facility should hold only:

- Pesticides in their original, labeled containers;
- Pesticide rinsate in designated and labeled tanks;
- Equipment necessary for transferring pesticides to and from bulk containers (e.g., hoses); and
- Emergency response equipment such as spill pillows and fire extinguishers, but NOT personal protective equipment (PPE).

Pesticides go in a pesticide storage area. . . .

and personal protective equipment stays out

What Stays Out

Keep food, feed, seed, plant propagation materials, fertilizer, veterinary supplies, and PPE separate from pesticides. Even the best-maintained pesticide storage facilities can harbor fumes, dusts from dry materials, and occasionally leaked liquids. Items contaminated by these pesticide sources can be damaged directly (e.g., plant material harmed by herbicide vapors) or cause harm to plants, animals, or people who are later exposed to them.

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Iceland's puffin population has long waxed and waned, following natural ocean temperature cycles, says Hansen, the nature research center's director. As Iceland's chief puffin scientist, Hansen makes a twice-yearly circuit of the nation's colonies to report on the season's breeding success. He has compiled more than a century of Westman Islands

population crash this century, Hansen says. For a decade and a half starting in 2003, chick production was below sustainable population levels. Scientists are investigating the reasons, but it looks like normal fluctuations are being amplified and disrupted by climate change. "We are seeing something extraordinary,"

sea surface temperature and hunting records to create the world's longest puffin population data set. Historically, reproduction slumped when a warm phase tanked the supply of sandeel—a nutritious, pencil-shaped fish that the Westman Islands megacolony relies on to feed its chicks. Sustained higher temperatures perturb sandeel metabolism and reproduction, causing a scarcity of prey close enough to the colony for parents to reach while tending young. Some years, most chicks have starved. Other

Hansen tells me. "Changes that just slap you in the face, they're so big."

Seabird babies face a tight schedule in the short northern summers. After around six weeks in the egg, pufflings have roughly six weeks to grow and fledge before winter returns. Yet in recent years, puffin breeding in the Westman Islands has sometimes been more than two weeks delayed. Hansen thinks the delays are linked to late starts for the spring ocean productivity cycle. If the puffins be-

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Drop Spreaders

Calibration of drop spreaders can be much like that for hand sprayers; run the equipment over a test area and determine how much material was used. For example, you can run the applicator at field speed over a large tarp of known area. The test area would then be the area of the tarp or, if the tarp is wider than the granular applicator's spread pattern, the test area would be the length of the tarp multiplied by the width of the application pattern. Collect the granules from the tarp into a container of known weight, place the container on a scale, and record the weight. Subtract the weight of the empty container to find the weight of the granules.
Alternatively, you can use a catch pan that collect granules as you travel a specified distance; the area covered would be equal to the width of the spreader times the distance traveled.

Use the following formulas to determine the application rate:

$$\text{Application rate per acre} = \text{Weight of granules collected} \times \frac{43{,}560 \text{ square feet}}{\text{Test area (in square feet)}}$$

$$\text{Application rate per 1000 square feet} = \text{Weight of granules collected} \times \frac{1000 \text{ square feet}}{\text{Test area (in square feet)}}$$

You can adjust the application rate by adjusting your speed or, with some applicators, by adjusting the metered openings.

Rotary Spreaders

The procedure for calibrating a rotary spreader is similar to that for drop spreaders except that you should determine the effective width of the spread pattern. Rotary spreaders distribute more granules in the center of the spread pattern than at the edges; therefore, you need to overlap successive passes over a treatment area to obtain a uniform distribution of granules.

Chunking

Physically divides information

Appears less daunting

Improves recall

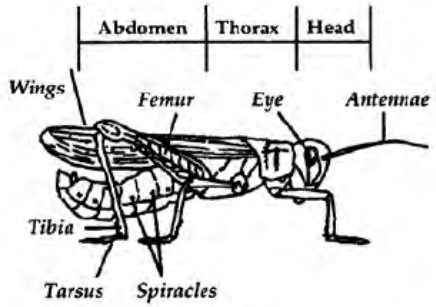
Insects

Insects are invertebrates (animals without backbones) and outnumber all other animals on Earth, so it's not surprising that they are perhaps our biggest pest problem. Because of this, we will go into more detail about insects than other pests.

Adult Insect Body Characteristics

Adult insects have three pairs of jointed legs for a total of six legs. Adult spiders, ticks, centipedes, and millipedes have more than six legs and therefore are not insects.

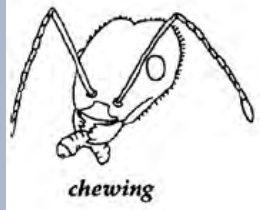
Adult insects also have three distinct body regions: the head, thorax, and abdomen. (However, the separation between the thorax and abdomen is not always easy to see.) Each region is covered by a hard, protective "skin" (called an "exoskeleton") and performs different functions.



Head

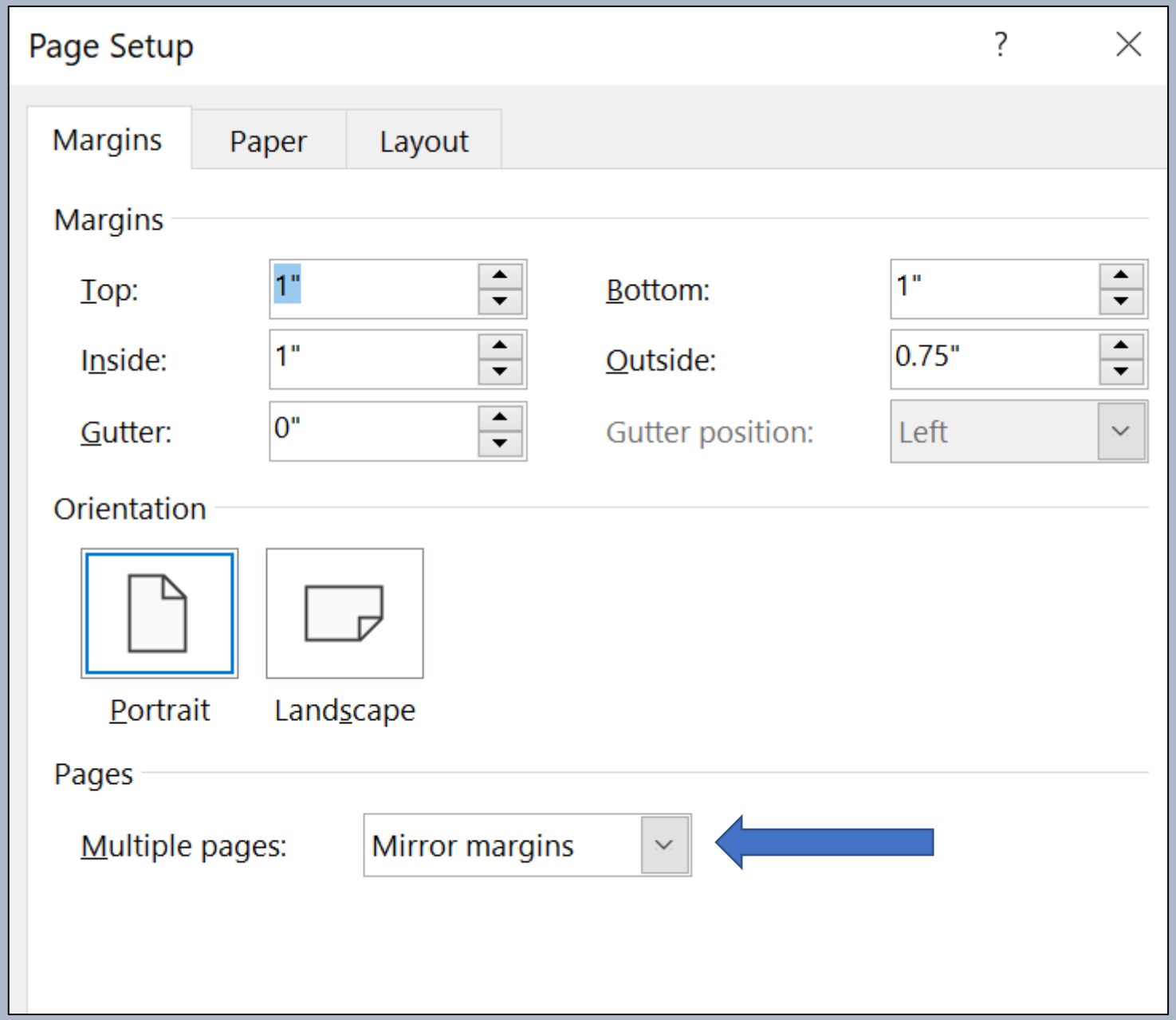
The insect head bears mouthparts, eyes, and antennae.

Mouthparts. Mouthparts vary among groups of insects, so you can use them to help identify a pest insect and the sort of damage it does. Therefore, it is important that you are aware of these types of insect mouthparts:


chewing

- Chewing mouthparts have toothed jaws that bite and tear the food. Beetles, cockroaches, ants, and grasshoppers have chewing mouthparts. These insects can cause damage in a number of ways, such as by eating plants, tunneling into structural wood, or chewing holes in fabrics.

Inside Margins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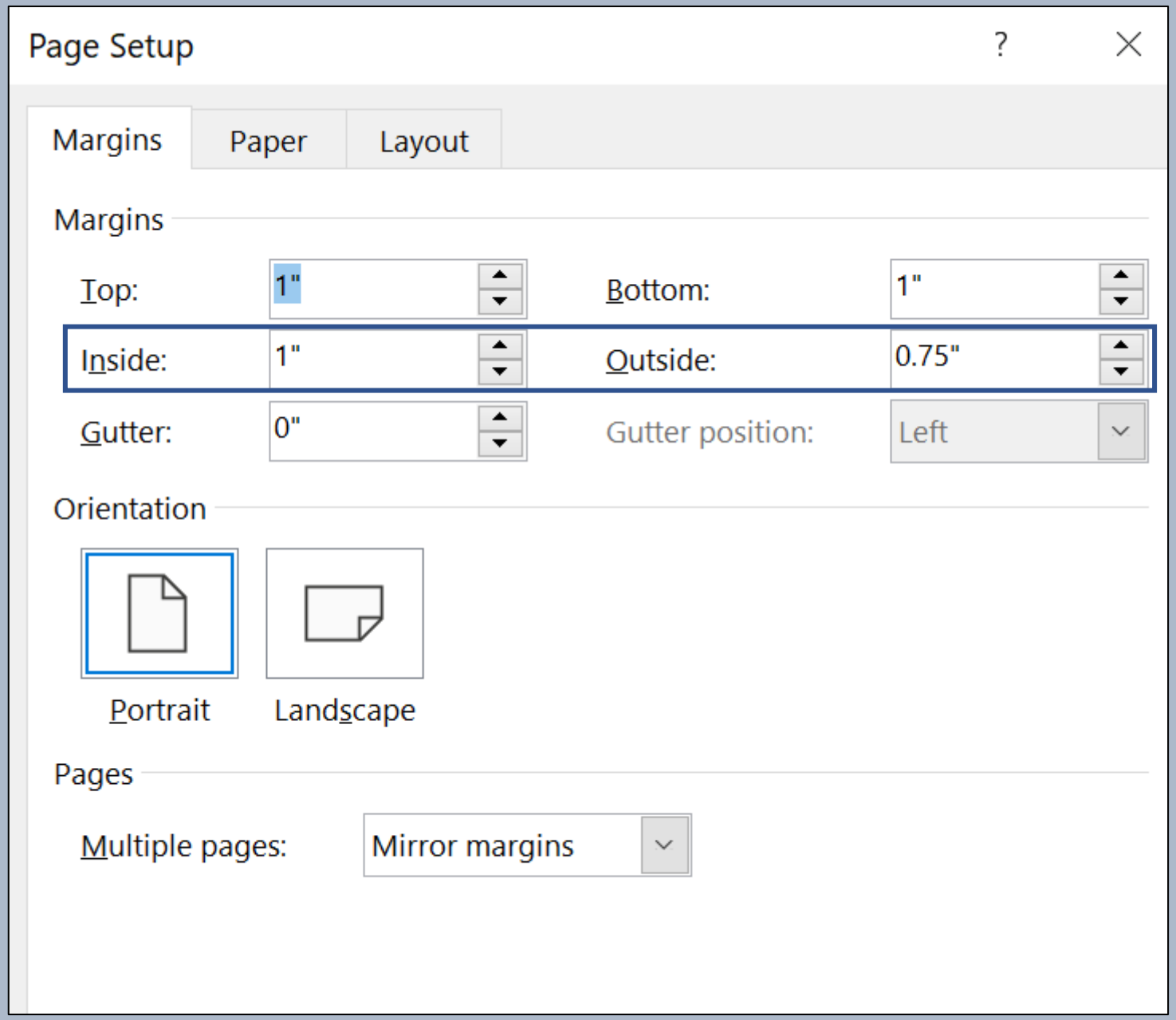
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Loading a Charge

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After you have cleaned the door seal, close the door securely. To prevent worker exposure in plants using creosote, penta, or preservatives containing arsenic or chromium, cylinder doors must be closed and locked remotely from a control panel that is at least 15 feet from the door. Regardless of the preservative used, the lock rings on a door must be secured when the door is closed.

Doors also are equipped with sensors that prevent the system from operating unless the door is sealed shut. If the sensor detects that the door is no longer secure, it shuts the system down automatically. In some facilities, any preservative in the cylinder would be immediately pumped back into the work tank. Shutting the system down does more than prevent preservative from spilling out of the cylinder; if the door is not properly sealed when the cylinder is under pressure, it could be blown open—or even off—with enough force to put workers at risk of serious injury or death.

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Singularities

A **singularity** is a weather event that occurs on or near a certain date with unusual regularity. The frequency of these events in the climatic record is greater than would be expected on the basis of chance alone. Most singularities are linked to regular changes in features of the global-scale atmospheric circulation. For example, in regions of seasonal precipitation, the onset and ending of the rainy season may constitute singularities. Consider some North American examples.

The **January thaw** is the most widely recognized and perhaps the only real singularity in a statistically rigorous sense. It is a period of relatively mild weather around January 20 to 23 and occurs primarily in the New England states. The thaw is caused by a flow of warm air on the back (west) side of the Bermuda-Azores anticyclone, which, for some unexplained reason, temporarily shifts north of its usual midwinter location.

Regular weather episodes that do not fit precisely the definition of a singularity, but are fairly predictable, are the July rainfall maximum in Arizona and the so-called Indian summer weather in the northeastern United States. In late June, the North Pacific subtropical anticyclone shifts abruptly northward, allowing the Bermuda-Azores high to extend its influence westward, across subtropical North America. The anticyclone's clockwise circulation pumps warm, humid air into the southwestern United States and brings a rainy end to Arizona's dry spring. For example, in Phoenix, Arizona, the mean monthly rainfall for April, May, and June is only 8 mm (0.30 in.), 3 mm (0.12 in.), and 2 mm (0.08 in.) respectively. For July, however, the mean monthly rainfall jumps abruptly to 20 mm (0.20 in.).

Indian summer usually develops in October, but it may also occur in November—there is no exact date. Large, warm anticyclones stagnate over the eastern United States, displacing the principal storm track northward along the Saint Lawrence river valley. Typical Indian summer weather consists of persistently warm, sunny days with hazy skies, cool nights, and frosty mornings.

Upper-Air Westerlies

The midlatitude westerlies of the Northern Hemisphere merit special attention here, because they govern the weather in the United States and Canada. As we have noted, in the middle and upper troposphere, the westerlies flow about the hemisphere in wavelike patterns of ridges and troughs (see Figure 10.6). Winds exhibit a clockwise (anticyclonic) curvature in the ridges, and a counterclockwise (cyclonic) curvature in the troughs. Between two and five waves typically encircle the hemisphere at any one time. These **long waves** are called **Rossby waves**, after Carl G. Rossby, the Swedish-American meteorologist who described and explained them in the late 1930s. The winds' wavelike configuration allows us to describe the westerlies by wavelength (distance between successive troughs or successive ridges), amplitude (north-south extent), and the number of waves encircling the hemisphere. The westerlies exhibit changes in all three of these measures and, as a direct consequence, the weather changes.

The westerlies are more vigorous in winter than in summer. In winter, they strengthen and have more waves of shorter length and greater amplitude. This seasonal difference stems from the north-south pressure gradient, which is steeper in winter because of the greater temperature contrast between north and south at that time of year. In summer, north-south temperature differences are typically minimal, pressure gradients are weak, and as a consequence, so are the westerlies.

Long-wave patterns

The "weaving westerlies" consist of a north-south wind superimposed on a west-east wind. We refer to the north-south airflow as the westerlies' **meridional component**, and the west-east airflow as the **zonal component**. The meridional component of Rossby waves brings about a north-south exchange of air masses and the poleward transport of heat. In the Northern Hemisphere, winds from the south carry warm air masses northward, and winds from the north transport cold air masses southward. Cold air is thus exchanged for warm air, and heat is transported poleward. As Rossby waves change in length, amplitude, and number, however, concurrent changes take place in the advection of air masses. Consider some examples.

Occasionally, the westerlies flow almost directly from west to east, nearly parallel to latitude circles, with a weak meridional component (Figure 10.8). This is a **zonal flow pattern** in which the north-south exchange of air masses is minimal. Cold air stays to the north, and warm air remains in the south. At the same time, the United States and southern Canada are flooded by air that originated over the Pacific Ocean. The Pacific air dries out to some extent as it passes through the western mountains, and it then warms adiabatically as it descends onto the Great Plains—spreading uniformly mild and generally fair weather east of the Rocky Mountains.

Avoid Widows and Orphans

Widow

First line of paragraph alone at bottom of page

Orphan

Last line of paragraph alone at top of page

White Space

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Doors also are equipped with sensors that prevent the system from operating unless the door is sealed shut. If the sensor detects that the door is no longer secure, it shuts the system down automatically. In some facilities, any preservative in the cylinder would be immediately pumped back into the work tank. Shutting the system down does more than prevent preservative from spilling out of the cylinder; if the door is not properly sealed when the cylinder is under pressure, it could be blown open—or even off—with enough force to put workers at risk of serious injury or death.

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Doors also are equipped with sensors that prevent the system from operating unless the door is sealed shut. If the sensor detects that the door is no longer secure, it shuts the system down automatically. In some facilities, any preservative in the cylinder would be immediately pumped back into the work tank. Shutting the system down does more than prevent preservative from spilling out of the cylinder; if the door is not properly sealed when the cylinder is under pressure, it could be blown open—or even off—with enough force to put workers at risk of serious injury or death.

Setting Up the Charge

Each step in pressure treatment processes (described in Chapter 2, "Methods of Wood Preservation") can be adjusted in length and/or magnitude to provide the proper penetration and retention of preservative. (However, there may be limits to the adjustments you can make; for example, AWPA standards may specify a maximum time and/or pressure for the pressure phase.) Such adjustments are

In this chapter, we will cover some of the treater's duties during the pressure treatment of wood.

Loading a Charge

Properly loading a charge into the cylinder helps ensure proper treatment and protect you and yard workers from chemical exposure and physical injury.

Putting the Charge Together

All pieces in a charge should be of the same species. As discussed in the first chapter of this manual, wood species differ in how easily they accept preservative; if a charge includes two species that differ in this respect, you may get good retention in one but not in the other.

Likewise, all pieces in the charge should have the same dimensions (e.g., 2" x 4" x 8' boards) or at least be within a single dimension of each other (e.g., 2x4s and 4x4s); pieces of different dimensions will treat differently. So, as with mixing species, mixing dimensions runs the risk of adequately treating only a portion of the charge.

Moving the Charge into the Cylinder

In pressure treatment operations, the treater or a yard worker straps untreated wood to trams (Figure 8-1), which ride along tracks from the drip pad into the treatment cylinder. The trams may be pushed into the cylinder with a forklift (Figure 8-2) or powered by a winch or pulley system. Wear protective gloves when you disconnect the forklift or winch/pulley system from the trams.

Figure 8-1. The charge is strapped to trams to keep it in place during treatment.

Often, there are removable tracks that span the gap between the drip pad and cylinder. To prevent worker exposure to chemicals, these tracks must be placed/removed mechanically in facilities that use creosote, penta, or wood preservatives containing arsenic or chromium. Wear protective gloves if you use another preservative and place/remove the tracks manually (Figure 8-3).

Figure 8-2. Using a forklift to push the charge into the cylinder for treatment.

Figure 8-3. Wear appropriate PPE if you handle removable tracks.

Sealing the Cylinder Door

Once the charge is in the cylinder and you've set any removable track aside, use a hose or long-handled brush to remove any dirt or wood chips from the door gasket and seal area. The debris results each time you open the door after treatment and some preservative solution flows out of the cylinder and into the door pit. Cleaning the gasket and seal area helps ensure a tight seal during the upcoming treatment. Wear appropriate PPE, including an apron and face shield if you wash the door with a hose. Replace the gasket as necessary, remembering to treat it as hazardous waste if required to do so.

After you have cleaned the door seal, close the door securely. To prevent worker exposure in plants using creosote, penta, or preservatives containing arsenic or chromium, cylinder doors must be closed and locked remotely from a control panel that is at least 15 feet from the door. Regardless of the preservative used, the lock rings on a door must be secured when the door is closed.

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Setting Up the Charge

Each step in pressure treatment processes (described in Chapter 2, "Methods of Wood Preservation") can be adjusted in length and/or magnitude to provide the proper penetration and retention of preservative. (However, there may be limits to the adjustments you can make; for example, AWPA standards may specify a maximum time and/or pressure for the pressure phase.) Such adjustments are

Girders, Sills, and Joists	Wooden girders, sills, and joists in or on foundation walls should be placed above the outside grade. If they are not, termites can find hidden access to this wood; furthermore, the wood may be more subject to decay. Floor joists and girders that are boxed in masonry concrete walls should have an air space of at least 1 inch around the sides and ends; because it is difficult to remove these timbers once they are structurally damaged by termites, it is good to use lumber that has been pressure treated with a preservative.
Wood Used in Basements	Wooden basement partitions, posts, and stair carriages should be placed after the concrete floor is poured. They should never extend into or through the concrete; otherwise they are not only subject to attack and damage by termites, but it will be difficult to detect the infestation because the termites will be able to tunnel directly into the wood without forming visible mud tubes. Using reinforced concrete under the wood helps ensure the concrete will not crack and let termites get through from the soil beneath. Concrete footings that extend about 3 inches above the floor level can be used under wood posts, stair carriages, heating units, and load-bearing points. Termite infestations in finished basement rooms are very difficult to detect and control. Not only are sills and joists hidden from view, untreated wood floors and furring strips are often used. Because of the danger of decay, wood screens, subflooring, and furring strips should be made from wood that has been pressure treated with a wood preservative. Termiticide applications to the soil and to any voids in the foundation before and during construction will help prevent infestations (see Chapters 3 and 4).
Water Pipes and Conduits	In crawl spaces, plumbing and electric conduits should be clear of the ground; they should be suspended from girders and joists where possible. Supporting them by wooden blocks or stakes connecting with the ground allows termites to tunnel through these wood supports or construct tubes over them to the sills, floors, and joists above. If plumbing extends from the ground to the wood above, the soil around the plumbing will need to be treated with termiticide. Likewise, soil at the site where pipes or other structural elements penetrate foundation walls or slabs will need to be treated and the opening properly sealed (e.g., with cement). We will discuss how to treat soil in Chapter 3.
Exterior Woodwork	Exterior woodwork that contacts soil or that is near grade level are susceptible to decay and so a builder should use wood that has been

“Word” of Caution

InDesign: Handles this format well

MS Word: Must use table format to make headings stay even with text if you add or delete text. Columns feature does not do that in Word.