4

Organizing Your Document

4.1 Descending Presentations
4.2 Ascending Presentations (or Why Are You Telling Me This?)
4.3 Other Internal Structures

4.1 Descending Presentations

Descending presentations start with a generalization—a big-picture conclusion and recommendation—and move to the specific supportive details. The vast majority of technical reports, particularly long ones, should have a descending arrangement.

On December 9, 1941, Franklin Roosevelt addressed the nation with these opening remarks: "... So far, the news has all been bad. We have suffered a serious setback in Hawaii. Our forces in the Philippines, which include the brave people of that commonwealth, are taking punishment, but are defending themselves vigorously. The reports from Guam and Wake and Midway islands are still confused, but we must be prepared for the announcement that all these three outposts have been seized." Roosevelt then continued with the specific details.

The TV news commentator states, "The stock market plunged 508 points today. Many have lost great fortunes. Stay tuned for the details."

The newspaper journalist presents readers with this headline: "Iranian Terrorists Take 50 US Hostages." Then the specifics are given in the succeeding paragraphs.

A descending arrangement presents broad generalizations and then moves into the specifics. In a technical report, the arrangement usually looks like this:

- Summary
- Conclusions and recommendations
- Discussion
- Supplemental documentation or attachments

In a reference manual such as this book, the conclusions are set off at the beginning of each section, with elaboration of the details and supporting exhibits following.

Why this arrangement? It's direct, clear, and easy to follow. Readers can read as much—or as little—as they want. The further they move through your document, the more details they receive. If they decide to stop reading before the end of the document or the end of a section, they haven't missed any buried key points.

Most management-level technical report readers are like newspaper readers. They want capsuled information as quickly as possible because they are inundated with paperwork. Reports of all kinds—feasibility studies, research reports, statistical analyses, trip reports, marketing survey results, status reports, and investigation reports—
arrive on their desks. Needless to say, they can’t read everything in full detail.

Your job as a writer is to make reading easier by presenting your most important information up front and leaving to readers how much or how little detail they want. In other words, this arrangement allows the reader to control his or her own reading according to the need-to-know principle.

Technical specialists reading your report also generally prefer this descending arrangement. Even though they may be as interested in the detailed discussion of the test procedures as in the conclusions, they will understand those details more quickly and more easily with the conclusions up front.

Compare your reactions to the two arrangements of the same material that are presented in Figures 4–1 and 4–2.

<table>
<thead>
<tr>
<th>Descending Arrangement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The Mark V press failure was caused by a broken blivit arm. All Mark V’s have been shut down pending inspection. Full production will resume Monday, July 1.</td>
</tr>
<tr>
<td>2. Inspection procedures have been revised to prevent a recurrence of the problem.</td>
</tr>
<tr>
<td>3. The blivit arm failed due to metal fatigue.</td>
</tr>
<tr>
<td>4. The fracture originated in the arm/body fillet.</td>
</tr>
<tr>
<td>5. The fillet radius was .040 of an inch smaller than design requirements.</td>
</tr>
<tr>
<td>6. Metallurgical analysis showed normal structure.</td>
</tr>
<tr>
<td>7. A complete report on the status of all blivit arms will be presented on July 10.</td>
</tr>
</tbody>
</table>

Figure 4–1. Descending arrangement. This arrangement of information always makes details clear and allows readers to control how much or how little elaboration they want.

4.2 Ascending Presentations (or Why Are You Telling Me This?)

Ascending presentations begin with specifics and move to generalizations. The ascending arrangement of information can be effectively used for jokes, movies, or novels. On rare occasions, it may be useful for presenting conclusions and recommendations against which your reader is strongly biased.

The suburban housewife finishes her phone call, kisses her husband goodbye, and walks out to her car, which is parked in the garage. The garage door rises as she presses the button. From out of the shadows, a gruff voice demands that she keep her mouth shut as brutish hands claw at her throat. She gasps for breath, then slides limply to the garage floor.

Commercial. The rest of the movie finally leads to who done it. Such is the ascending arrangement of information, the once-upon-a-time format. In a technical report, the format usually looks like the following:

- Introduction
- Scope
- Testing procedures
- Findings and discussion, with supplementary tables, figures, and charts
- Conclusions
- Recommendations

In a reference manual, the ascending arrangement might look like this:

- What’s included in your software package
- Product specifications
- Steps 1, 2, 3 in performing task A
- How task A benefits the user
- Steps 1, 2, 3 in performing task B
- How task B benefits the user
- Steps 1, 2, 3 in performing task C
- How task C benefits the user

If you use this arrangement for most information, your audience must read blindfolded. You control your readers’ time and attention, forcing them to follow your reasoning slowly and deliberately. If this
... then this ... then this ... therefore, it follows that .... You as the writer completely control how much or how little you want to reveal to the readers and in what order (see Figure 4–2).

Needless to say, the arrangement in Figure 4–2 usually annoys busy management readers who want to control their own time. Their reaction is quite often, “Tell me what your main point is and I’ll decide if I want to hear more.”

On the other hand, if you think your reader is so biased against what you have to say that you have to sneak up on his or her blind side, then you might well choose the ascending format. You hold up the reader’s first cherished idea, then refute it. Next, you hold up the reader’s second most cherished idea, then knock it down. Finally, you present the only remaining option—your conclusions and recommendations—and hope you have left the reader no alternative but to accept your position.

Sometimes it works and sometimes it doesn’t. Sometimes the reader bows to your reasoning and lets you lead him or her down the primrose path. On other occasions, the reader refutes your ideas each step of the way and arrives at a conclusion totally different from yours (see Figure 4–3).

Unless your report is so short or of such great interest that all readers will want to read every single detail, avoid the ascending arrangement.

4.3 Other Internal Structures

There are several ways to organize the details within either an ascending or a descending document format. Don’t grab the first arrangement that comes to mind; choose the most appropriate one for your purpose. Whatever your choice, that organizational framework should be apparent to your reader.

To design a building, you put up the framework and scaffolding, then proceed to construct the walls. The same principle is true with writing.

One Danger of Ascending Arrangements

We’re having a problem with Bill in sales.

Bill is bored with his job.

Bill’s administrative assistant bungles client calls.

We could hire a new assistant for Bill, but that would not alleviate his boredom.

We could expand Bill’s sales territory to challenge him more, but John would get angry.

We could increase Bill’s product line to challenge him more, but the new products won’t be ready for another six months.

Therefore, to motivate Bill, let’s give him a bigger commission percentage (your conclusion).

Therefore, let’s fire Bill [reader’s conclusion].
The framework is your plan for what goes where, and it should guide you in writing the document. It should also guide the reader. Much like homeowners walking along the rafters of their attic, readers should be able to see the rafters of your document and go from key point to key point without getting lost in the details between.

Some of the most widely used frameworks follow, along with some of their weaknesses.

Chronology as a framework. Investigative reports frequently employ this structure. The arrangement moves from "once upon a time" to "they lived happily ever after." A common danger in this arrangement, however, is that writers tend to include every little insignificant detail. The choice of a chronological arrangement doesn't mean you must tell everything Tom, Dick, and Harry did. You should probably include in your chronology only important events, such as when they made good decisions, turned corners, or slid in the ditch.

Use chronological order only if the time relationships involved will contribute to the reader's understanding.

Geography as a framework. Customer- and client-orientation documents tend to use this framework. One danger lies in repeating the structure from locale to locale. Sometimes a geographical arrangement makes sense; sometimes it doesn't.

Most important to least important as a framework. This arrangement is commonly used in documents intended to persuade. One advantage is that it allows readers to stop reading as soon as they are convinced of your conclusions. A weakness in this arrangement is that if readers don't agree with you about which points are most convincing, you may lose them by seemingly concentrating on trivialities and ignoring what's important.

Cause to effect (or effect to a cause) as a framework. The structure is this: Cause 1, cause 2, and cause 3 lead to effect XYZ. Or it can be stated thus: Effect XYZ is the result of causes 1, 2, and 3. A common weakness in this arrangement is that facts are presented as if they needed no interpretation. Scientists are often heard to say, "The facts speak for themselves." To this, most readers will say, "Maybe, but I don't speak that language." Thus, the writer's interpretations should bridge the gap between facts and the readers' understanding of those facts.

Comparison and contrast as a framework. This arrangement looks like this: System A and system B are alike in X, Y, and Z. Or System A and System B differ in X, Y, and Z. Typically, a writer misuses comparison and contrast in the following manner. He or she tells us all the features and specs of machine A, then all the features and specs of machine B, and then all the features and specs of machine C. Such an arrangement is ineffective and makes it difficult to keep score—that is, readers won't know how to evaluate the facts about machine A until they have all the information about machines B and C.

If you choose the comparison and contrast arrangement, it is usually more effective to arrange the details by criteria, as shown in Figure 4–4. Of course, tabular presentations of criteria and options often convey information to be compared or contrasted better than paragraph arrangements (see Part 4).

Problem to solution as a framework. For most problem-to-solution documents, present your problem first, then the proposed solution, then supporting documentation, then refutation of alternative solutions. Omit irrelevant details.

Another possible format is to present your problem, then all the possible alternatives, knocking them down one by one. Finally, you present the solution you are proposing. This arrangement can be effective, particularly if you know your reader is against your solution.

<table>
<thead>
<tr>
<th>Comparison and Contrast Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ineffective</td>
</tr>
<tr>
<td>Machine A</td>
</tr>
<tr>
<td>Cost</td>
</tr>
<tr>
<td>Ease of operation</td>
</tr>
<tr>
<td>Delivery schedule</td>
</tr>
<tr>
<td>Machine B</td>
</tr>
<tr>
<td>Cost</td>
</tr>
<tr>
<td>Ease of operation</td>
</tr>
<tr>
<td>Delivery schedule</td>
</tr>
<tr>
<td>Machine C</td>
</tr>
<tr>
<td>Cost</td>
</tr>
<tr>
<td>Ease of operation</td>
</tr>
<tr>
<td>Delivery schedule</td>
</tr>
</tbody>
</table>

Figure 4–4. Comparison and contrast documents. Arrange information by criteria, not by options.
But a big danger in saving your real conclusion (the proposed solution) until the end is that your reader may wonder where you’re going and grow impatient with the irrelevant alternatives.

**Description as a framework.** Descriptive passages should not consist of descriptive details jumbled together. The organization of the document should be apparent to your reader. Try to proceed from familiar ground to the less familiar or the unfamiliar.

In describing an object, generally your writing will be more effective if you describe it from the inside out. Start with the internal motor mechanism, then move outward to its casing, then to the entire vehicle body, and finally to the decorative trim.

**Numerical or alphabetical arrangement as a framework.** Enumerated or alphabetized items usually indicate that all the points are equally important. The enumeration or alphabetical listing simply gives a point of reference from one document or discussion to the next.

To repeat: Your ideas will not automatically come to mind in a smooth framework. No matter. Simply use one of the organizational methods presented in Chapter 3, such as the idea wheel, to capture your thoughts. Then when you have all the details at hand, you can structure them into one of the document frameworks described above.

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**Paragraph Development**

5.1 What Paragraphs Do For You
5.2 Overview Statements for Skimmers
5.3 Five Ways to Make Your Paragraphs Hang Together
5.4 What to Do with “Stray” Ideas
5.5 Paragraph Length
5.1 What Paragraphs Do for You

Paragraphs serve five major functions in your writing: to introduce, to support, to repeat, to link, to conclude.

In school, we didn't have much trouble with paragraphing because most English teachers required the standard five-paragraph essay:

- Paragraph 1: an introductory paragraph with a thesis statement
- Paragraph 2: first point and supporting detail
- Paragraph 3: second point and supporting detail
- Paragraph 4: third point and supporting detail
- Paragraph 5: conclusions and usually a restatement of thesis

Few writers ever learn the other ways paragraphs can serve them or discover the variety of paragraphs that are available. Consequently, they have monstrously long paragraphs full of details that don't really fit together well.

Think of your document as a string of chain links, not a chain-link fence. In a fence, the links (paragraphs) are rigid. But a loose chain has links that can be twisted, allowing the chain to be wrapped around whatever object you want to tie down. Your own writing should be full of twistable links—paragraphs that serve your different writing purposes.

Paragraphs can do all of the following:

Introduce an Idea

During the 1960s and 1970s, custodial care for the severely mentally ill in large state hospitals was abandoned and replaced by care in the community. Four influences lay behind this shift.

The first was . . .

Define a Term

One of the most common problems seen in the oil industry is that of cement gelation. Gelation can be defined as a premature viscosification or a gel-strength buildup of the cement slurry. This can have important consequences in field operations and may be so severe as to cause job failure.

Outline a Step or Stage

For this method, pick up a special squeeze packer with a retrievable-drillable bridge plug and run them in the hole on the bottom of the work string to within one joint of the top perforations of the production zone.

Set the bridge plug at this depth and release packer tension. Pull four strands of the tubing out of the hole. Rig up a pumping manifold to pump separately down both the tubing and annulus. Pump the well servicing fluid down the tubing with returns run to the pit through the blooie line. This should ensure that the hole is gas-pocket free. Set the packer at this depth and fill both the tubing and annulus with the well servicing fluid.

Pressure up the annulus to a maximum surface pressure numerically equivalent to 10% of the packer's depth.

Present an Analogy

"Observing the instant of a molecule's creation is for a chemist what observing the Big Bang would be for an astronomer," says Ahmed Zewail of the California Institute of Technology. "Molecules form our microworld and it is of fundamental importance for chemists to know how atoms and molecules get together to form new molecules."

Give an Example

One example of variable hazards along a pipeline route is shown in Table 1 where a submarine pipeline is subject to increased risk of damage from anchors and dropped objects in the vicinity of an offshore platform, a low risk from anchors and fishing gear along most of the subsea route, increased risk of scour from wave or current action in the near-shore

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zone, and possible third party interference on the land section.  

Provide a Quotation

Workers caution that whatever is found out in animals is not ipso facto transferable to humans. “Learned helplessness is one route into depression,” says Steven F. Maier of the University of Colorado at Boulder. “It is not synonymous: there is no one-to-one relationship.” Learned helplessness, he points out, affects every system in the brain, bringing about a potent and widespread cascade of effects that are expressed in a range of behaviors.²

Tell an Anecdote or Provide a Case History

Inside the refrigerated vault, a clerk at a private pediatric hospital in New York wears gloves to keep her hands warm, but when she tries to type information into the computer about the arrival and distribution of supplies, keyboard errors sometimes creep into her work because of the gloves. However, with a voice recognizer, she dictates shipment data directly into the PC—without error.

Give Reasons

The three tanks in question were sold for the following reasons: We were in the process of abandoning this lease, and had to complete land reclamation before winter. Second, the tanks had to be moved before we could reclaim the area. Third, the equipment needed to reclaim the land was already in the area, saving us time and money. Finally, to haul the tanks 200 miles to the Rewo Warehouse was economically unfeasible.

Answer a Question

What shape does the new cavity take? Because the formation sand is saturated in salt water, the cavity is probably shaped somewhat like a cone, with the angle to vertical roughly equal to the angle of internal friction for sand.

Provide a Solution

A difficulty that occurs with the resistance furnace is the inability to connect the power leads to the high-temperature resistance elements. This materials temperature problem is usually solved with elaborate water cooling techniques. One alternative is to feed the electrical power into the heating unit via an induction coil.

Link Two Ideas

Despite these disadvantages to the new system, the software does enhance productivity in preparing monthly statements to customers.

One advantage . . .

Restate Something Already Said

Static pressure is constant at a particular altitude above sea level and dynamic pressure varies with the square of the velocity. If one divides the total drag force by the dynamic pressure and the frontal area (pressure × area = force), the drag coefficient becomes a dimensionless parameter that does not depend on the frontal area of the object or its velocity. We can rearrange the drag coefficient equation thus:

\[ \text{drag force} = c_d \times \text{frontal area} \times \text{dynamic pressure} \]
\[ = c_d \times \text{frontal area} \times \text{constant} \times \text{velocity}^2 \]

In other words, it is apparent from this equation that for a given velocity there are only two ways to reduce the drag force: Reduce the drag coefficient and/or reduce the frontal area of the object. Thus, all aerodynamic improvements to a bicycle will either reduce the drag coefficient or reduce the effective frontal area of the bicycle and rider combination.

Conclude a Point

Finally, in the atmosphere of justifiable satisfaction over the new data supporting the use of t-PA², it is important not to forget the knowledge gaps that remain. The optimal regimens of drug administration are unclear; the value of adjunctive therapy is not defined; and the extent of benefits
and risks is incompletely known. Efforts to resolve these and related issues must continue.7

Most documents include a wide variety of paragraph structures. For each paragraph in Figure 5–1, note the structure and what the paragraph does to mold the ideas into a cohesive unit.

### 5.2 Overview Statements for Skimmers

Every paragraph should have an overview statement, usually the first sentence. This overview statement allows skimming readers to pick up the key points in a document and to select which paragraphs to read in full.

“You mean I’m writing all that long discussion for nothing?” workshop participants query in a hostile tone when we tell them that few readers, particularly senior executives, read every word they write in their reports.

Not “for nothing” we assure them. The long discussion of involved details and data has to be in the document to support the conclusions and recommendations. But every reader doesn’t have the same interest in the same details. Therefore, most professionals will read selectively.

Overview statements or topic sentences make this selective reading possible. Therefore, be careful about using bottom-up paragraphs. Some writers give details, details, details, and then finally give the point about the details. Reverse that order. Give the reader your point, then elaborate (see Figures 5–2 and 5–3).

### 5.3 Five Ways to Make Your Paragraphs Hang Together

Paragraphs must fit together logically. Here are five techniques to give paragraphs the necessary coherence: framework devices, repetition of key words or phrases, transitional words and phrases, transitional paragraphs, and headings or lists and white space.

See if you can follow the passage on page 38.


### Various Paragraph Structures Within a Single Document

**To Introduce**

Egypt has maintained greater exploration and general development activity levels than most countries in the Middle East. The government's desire for new fields to sustain production has helped support activity.

**To Give Statistics**

In the first four months of this year, output averaged almost 890,000 b/d. For the fiscal year from July, 1987, through June, 1988, average production is forecast at 870,000 b/d.

**To Give Reasons**

New permits have been made available to stimulate exploration by foreign companies and a clutch of new discoveries in the Western Desert has helped maintain interest.

**To Give an Example or Illustration**

Development in the Western Desert has been held back by the crude oil transportation difficulties. But in the past year, two new pipelines to El Hamra terminal on the Mediterranean coast have been commissioned.

**To Explain**

There are now three crude pipelines spanning the desert, and a number of small finds can be linked into the transportation system.

**To Link Two Ideas**

While the Western Desert captures the headlines because of recent discoveries and bid rounds, the bulk of Egypt's production comes from the Gulf of Suez.

**To Give Statistics**

Production, principally from the El Morgan, July, and October fields (all in the Gulf), has been averaging around 500,000 b/d of oil, with 100 MMcf/d of gas from the Western Desert. GUPCO accounts for just under 60% of total national output.

**To Conclude**

Cumulative production from El Morgan is expected to top 1 billion bbl next month.


Figure 5–1. Various paragraph structures within a single document. Paragraphs can serve a variety of functions.
His lips twisted into a distorted position as he yanked the stocking and football helmet over his head. Rearranging the boxes of paperbacks in front of him, he rooted out a seat behind the door and beneath the shelving. After a moment, he stood up again, dug a knife out of his jeans pocket, examined it carefully, then tucked it into his waistband. He slid back down into the cramped space.

Danielle Ryggs returned the last composition, steered herself against the rumbles throughout the classroom, and backed away toward her desk. She raised her eyebrows slightly to invite questions.

**Overview Statements**

Several lines of evidence indicate that the activities localized at the anterior and posterior egg poles are necessary and sufficient for the establishment of polarity in the *Drosophila* embryo. The inhibitory interactions between the anterior and posterior activities observed in the transplantation experiments may play a stabilizing role in normal development. Elimination of the anterior activity in *bed* embryos facilitates the formation of a bipolar pattern—a bicaudal embryo—in transplantation experiments. Likewise, double-headed embryos can be induced by transplanting anterior cytoplasm to the posterior of a mutant of the posterior class. In double mutants of *bicoid* and *oskar*, polarity is no longer detectable, and in transplantation experiments, head structures can be induced in the posterior and abdomens at the anterior without encountering inhibitory effects residing in the recipient embryo.

Although formally the two activities appear to have symmetrical (reciprocal) properties, there are a number of significant differences between the anterior and posterior activities.

The differences between the two activities are not restricted to the degree of mutual inhibition.


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Do you know what's happening? Not yet. But with a little transitional phrase such as *Further down the hallway* inserted at the beginning of the second paragraph, we would immediately understand the connection between the helmeted football player and his victim, the classroom teacher. The light goes on: Danger lurks behind the door.

Suspense is fine for the entertainment industry, but technical readers like to know where they are at all times, and you as a

**Buried Key Ideas**

Table I summarizes the oil production values of each well in the pilot area, which are illustrated in graphs 7 to 27. The best-fitting line through the oil production curve is also drawn on each graph. It is noted that 18 wells and 86 percent of the total number of producers showed an increase in oil production. This gain in oil is most significant for the five producers (13–2, 15–2, 3–11, 5–11, and 7–11) that are surrounded by four of the five treated injectors (11–2, 16–3, 1–11, and 11–11). The well 7–14–6–12, suspended in October 1970 for economic reasons, was put back on production four months after the treatment and is now producing an average of 25 BOPD at 70 percent oil cut. The total gain in oil at the end of August has been approximately 237 BOPD. It was noted that the index of determination of the individual well best-fitting lines is generally very poor (ranging from a low of .001 to .76) and only modest confidence can be placed in these results; however, the best-fitting lines through the test oil production data of the entire pilot area is characterized by good correlations (.86 and .93) and can be used with confidence. This group relationship indicates a total oil gain at the end of August of approximately 253 BOPD. This gain in oil is also confirmed by the best fitting line through the oil cut curve of the pilot area. At the bottom of Table I, the comparison can be made for each indicated date between the total derived from individual well performance and the total of the pilot area. There is good correlation between these figures.

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Figure 5–2. Overview statements. A skimming reader can read first sentences in paragraphs such as these and have the most important ideas.

Figure 5–3. Buried key ideas. A skimming reader might miss key points buried within a long paragraph such as this one.
writer must provide that sense of security through paragraph coherence.

Framework Devices as Transitions
The first technique, the one used in the previous excerpt, is a framework device. In other words, with those words *Further down the hallway* the reader makes the connection of place. The people are dangerously near each other.

The most frequent framework technique is the old *first, second, third, and finally linking of ideas*. Other common framework transitions include the following:

- Reasons: The first reason... Another reason... A final reason...
- Parts of a whole: The internal mechanism contains... The external mechanism contains...
- Spatial arrangement: The lower lever serves to... The upper lever serves to...
- Steps, stages, or processes: The boil-down stage... The coating stage...

You have the idea. The opening words of each paragraph remind you of the document framework so that you see where each major section starts and stops.

Transitional Words and Phrases
A second way to make your paragraphs coherent is to use transitional words and phrases that exist as links wherever they appear in a document (see Figure 5-4).

Transitions tell readers to go forward to the next point, to back up and review where they've been, or to pause for an illustration. Without these road signs to guide them through the details, readers frequently lose the trail of logic from sentence to sentence or paragraph to paragraph. Note how the transitions in the following passage provide a trail:

Hazard analysis includes but is more than just a prediction of the consequences of failure in terms of injury to people or damage to property. Although these are not trivial and they involve the use of mathematical modelling techniques and engineering judgment, the analysis also involves identification of potential hazards. Such identification then can lead to recommendations for prevention.

A second important point, if obvious, is that the analysis must be designed to answer the particular needs of the constructor, operator, or regulatory authority who requires the study. For example, the study should also use appropriate techniques for the physical characteristics of the equipment, both its housing and its operating environment. Therefore, different approaches and methods of presenting results have to be used.

Repetition of Key Words and Phrases
The most common transition between thoughts is the simple repetition of a key idea or phrase. You can repeat exactly the same noun, give a synonym for that noun, or use a pronoun that refers to that noun.

When the meter is taken out of service, the installer should bypass the meter and close the upstream and downstream valves. These valves [repetition] isolate the meter from line pressure. This procedure [synonym] is standard in field testing because it [pronoun] allows quick and safe removal of the meter.

<table>
<thead>
<tr>
<th>Transitions</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Therefore</td>
<td>Although</td>
<td></td>
</tr>
<tr>
<td>In addition to</td>
<td>So</td>
<td></td>
</tr>
<tr>
<td>Furthermore</td>
<td>For this purpose</td>
<td></td>
</tr>
<tr>
<td>Most of all</td>
<td>Accordingly</td>
<td></td>
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<tr>
<td>Above all</td>
<td>Thus</td>
<td></td>
</tr>
<tr>
<td>In like manner</td>
<td>This being true</td>
<td></td>
</tr>
<tr>
<td>Likewise</td>
<td>To illustrate</td>
<td></td>
</tr>
<tr>
<td>Equally</td>
<td>For example</td>
<td></td>
</tr>
<tr>
<td>But</td>
<td>In summary</td>
<td></td>
</tr>
<tr>
<td>Nevertheless</td>
<td>To repeat</td>
<td></td>
</tr>
<tr>
<td>Granted</td>
<td>In addition</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5-4. Transitions. These words and many others like them serve as road signs.
Transitional Paragraphs

In addition to the techniques already mentioned, sometimes paragraphs need something bigger to link them with other paragraphs. In other words, the reader has been stepping from one tiny flagstone to another along the walkway, then suddenly comes to a swinging bridge over a creek. The transitional paragraph ties the two walkways together via a transitional idea. Figure 5–5 shows how such paragraphs bridge the gap.

Headings, Listings, and White Space

Another useful transitional technique is the use of headings, listings, and white space. Each of these devices indicates to a reader the relationship of one idea to another. A new heading and surrounding white space says to the reader, "I'm finished with that idea; let's move to the next one." A numbered or bulleted list says, "This idea can be broken down into subparts." Extra white space says to the reader, "End of current topic; take a breath. Here comes a new part."

Use whichever transitional technique is most appropriate for your sentence, paragraph, or document. Just remember to leave a trail with transitions so your reader can easily follow your reasoning from point A to point B.

5.4 What to Do with "Stray" Ideas

Stray ideas easily get lost in unrelated paragraphs. When details don't seem to fit in any particular paragraph, use a miscellaneous "dumping" paragraph and alert the reader to what's there by a warning note or an all-purpose topic sentence.

You've probably seen an interior decorator cart a green plant around from place to place in a living room, backing off to take a critical look from each perspective. Writers have a similar difficulty; some details seem to defy logical placement.

When that is the case, question whether you need the detail at all. If the answer is yes, then you have two ways to call the reader's attention to it.
A Warning Note

First, when some fact, statistic, qualifier, or other explanation doesn't fit the logical flow of your document, mark it NOTE: and change the page layout. When readers come to such a note, it's almost as if they press the pause button, turn aside to read the insert, and then resume the flow of the main ideas.

A "Dumping" Paragraph

A second way to present miscellaneous ideas is in a "dumping" paragraph with an all-purpose overview statement. Consider the examples that follow:

In addition to the slow speed and imprecision of the machine, there are other minor inconveniences, inessential to most users but nevertheless annoying: . . .

Let me insert one caution, however, before we proceed with the other steps: . . .

Other secondary testing procedures included . . .

Whichever of the above techniques you use to present necessary but hard-to-place details, don't let the reader overlook them by keeping them buried in paragraphs of unrelated information.

5.5 Paragraph Length

There is a direct correlation between paragraph length and comprehension. In general, paragraphs should not exceed about 14 lines or one-quarter of a page.

Contrary to what we learned in English class about the five-paragraph theme, you can't always complete an idea in a single paragraph. Eye appeal is important. Long paragraphs wear readers down, particularly long paragraphs of complex material. Studies show that comprehension drops off drastically when paragraphs run more than about 14 lines or one-quarter of a page. (You can check your own comprehension as you read versions 1 and 2 in Figure 5–6.)

There is no minimum length for a paragraph. A transitional paragraph may be only one word (often used for effect in fiction) or one sentence.

Paragraphing: Comprehension and Eye Appeal

Version 1:

These sound waves are analyzed by the instrument and the results are displayed on the CRT as wave forms. There are four characteristic wave forms. The patterns are easy to identify and remember: The ideal weld displays a short, double-spaced train because the sound wave has penetrated both mating pieces. The returning sound shows a decrease in intensity and amplitude. A second pattern occurs when no weld is formed. The echo train is tall and single-spaced, indicating that only one piece of sheet metal has been penetrated. Attenuation is low because there is no weld nugget to absorb the sound. Still another pattern is revealed by a marginally undersized weld. Single spacing appears between double-spaced echoes because only a portion of the sound has penetrated the weld. The rest has been reflected from the mating surface. The last pattern is that of a stick weld. The echo train is double-spaced, but it is tall because no sound attenuation has occurred—even though both pieces of metal have been penetrated.

Version 2:

These sound waves are analyzed by the instrument and the results are displayed on the CRT as wave forms. There are four characteristic wave forms. The patterns are easy to identify and remember:

• Ideal weld. The echo train is short and double-spaced because the sound wave has penetrated both mating pieces. The returning sound shows a decrease in intensity and amplitude.

• No weld formed. The echo train is tall and single-spaced, indicating that only one piece of sheet metal has been penetrated. Attenuation is low because there is no weld nugget to absorb the sound.

• Marginally undersized weld. Single spacing appears between double-spaced echoes because only a portion of the sound has penetrated the weld. The rest has been reflected from the mating surface.

• Stick weld. The echo train is double-spaced, but it is tall because no sound attenuation has occurred—even though both pieces of metal have been penetrated.


Figure 5–6. Paragraphing: comprehension and eye appeal. The long paragraph in version 1 makes the information difficult to read and to recall. Version 2, with smaller paragraphs and informative headings, is more appealing to read and easier to retain.
Transitional words and phrases will lead your reader into a new paragraph even if the subject of the previous paragraph is not fully developed. Perhaps one paragraph presents three reasons for some course of action. With a good transitional phrase such as a fourth reason, the reader will continue into the new paragraph for the rest of the idea.

Every time readers come to a new paragraph in the text, they can pause, take a deep breath, and tackle a new idea. A paragraph is the pause that refreshes.

Sentence Structure

6.1 The Long and Short of It:
Sentence Length Sets Reader Pace
6.2 Improper Subordination of Ideas
6.3 Non Sequiturs and Illogical Gaps
6.4 Incomplete and Run-on Sentences
6.5 Parallel Structure
6.6 Dangling Constructions
6.7 Commas That Change Meaning
6.8 Misplaced Words, Phrases, and Clauses
6.9 Tense and Mood Changes
6.1 The Long and Short of It: Sentence Length Sets Reader Pace

Sentences should be as long or as short as necessary to serve your purpose. The average sentence should not run more than about 20–25 words. Both sentence length and pattern determine the reader's pace through your material.

When one engineer we know went to work for a large corporation, his boss told him that no sentence should be longer than 26 words. For over 20 years, this man has dutifully counted every word in sentences approaching this limit. He still feels guilty: "Should articles also count as words? This sentence has 29, but I can't think how to rewrite it."

The average sentence length in business and technical writing today is about 20–25 words. But the issue should always be clarity, not obedience to artificial restraints. Occasionally, however, technical writers will run a sentence marathon in which they try to convey every known detail and qualification about a concept in a single sentence. Consider the following example:

By increasing the trapped-gas saturation alone, the relative permeability to water is reduced to be consistent with the relative permeability relationship measured in the lab; however, the physical system is more nearly represented by parallel flow paths for the gas and water phases so that the water relative permeability at the increased trapped-gas saturation should be increased to the conformance fraction of the water relative permeability at the original trapped-gas saturation. [74 words]

Technical information is complex enough for most readers without the writer making it more difficult with complicated sentence structure. The longer the sentence, the more decoding effort is required to get to the basic idea.

Consider these paraphrased clichés:

A miniscule amount of effort to avert undesirable occurrences is the equivalent of a much greater countermeasure.

When one comes to a point in one's life at which one experiences an overwhelming desire to pursue and achieve a specific goal, one's mental faculties, creativity, and emo-

tional strength will overcome all obstacles standing between one and the desired goal.

Did you recognize the clichés? How about "An ounce of prevention is worth a pound of cure." And "Where there's a will, there's a way."

In the long versions, you have to spend so much time decoding the written symbols that the ideas themselves become obscured by the words.

That is not to say that you should never write a long sentence. But writers who habitually use long sentences become a nuisance to the reader because long sentences usually tangle ideas. Short sentences, on the other hand, add impact to the ideas they convey:

It is most important that this section be completed in its entirety because the executive research committee will be auditing our research plans in future quarters, and members are especially interested in how lab work done by employees in the E&P group relates to the plan of studies outlined for the three new chemists. Incomplete forms will be discarded.

You see how much more attention you give to the last sentence? That's because it's short.

In addition to length, the reader's pace through a document is also determined by the sentence pattern.

English sentences usually follow four basic patterns. The building blocks of these sentence patterns are clauses.

An independent clause has a subject and verb and stands alone:

The deliverability is increased by one-fifth.

A dependent clause has a subject and verb but does not express a complete thought. It must be attached to an independent clause for full meaning:

Because the deliverability is increased by one-fifth, . . .

The various sentence patterns are the simple, compound, complex, and compound-complex.

Simple sentences. Simple sentences contain only one independent clause. Simple sentences are usually direct and easy to read.

We estimated the radial position of the water front by planimetering the contact area.
Compound sentences. These sentences have two or more independent clauses. They divide the reader’s attention and force consideration of two or more ideas at once. The reader, therefore, must slow his or her pace to concentrate on both.

We estimated the radial position of the water front by planimetering the contact area; however, the accuracy of this determination depends on the model grid.

Complex sentences. These sentences have one independent clause and one or more dependent clauses. This structure adds peaks and valleys. Listen to the writer raise and lower her voice throughout the following example. The although clause is the beginning of the uphill climb. Gradually the reader trudges over the hill and then slides down to the main point in the last clause. Complex sentences add variety to writing and help emphasize the most important ideas.

Although the slumping problem manifests itself most visibly in the enhanced gas recovery (EGR) predictions, it is also present in the primary depletion case.

Compound-complex sentences. The compound-complex sentence pattern has at least two independent clauses and at least one dependent clause. Compound-complex sentences really slow the reading pace. A reader has to follow the peaks and valleys while also concentrating on two equally important ideas. Most compound-complex sentences are too long for fast, easy comprehension.

Because the optimal timing for ending water production will be very sensitive to aquifer description, the best opportunity will appear late in the project life; therefore, we should revise our timing estimate after we have evaluated aquifer response to water production.

In general, to get your point across clearly, quickly, and emphatically, prefer simple or complex sentences of 25 words or less.

### 6.2 Improper Subordination of Ideas

The way you link ideas in a sentence conveys both meaning and emphasis. Put the most important idea in the main clause and that clause in the most emphatic sentence position. Subordinate minor ideas.

Have you ever heard someone say, “I know what you said, but I don’t know what you mean”? The implication is that the emphasis or interpretation of an idea is improper. Only you as the expert know how your ideas relate to each other and what key points need emphasis. You control the reader’s interpretation by the way you link ideas.

To show you how powerful linking words and sentence positions can be, consider the difference in the messages of the following sentences:

- Tom pays his bills, but he’s a real pain. (Maybe we shouldn’t do business with him.)
- Tom’s a real pain, but he pays his bills. (His business is worth the trouble.)
- Tom’s a real pain, although he pays his bills. (An afterthought.)
- Although he’s a real pain, Tom pays his bills. (Let’s keep his business.)
- Tom pays his bills, and he’s a real pain. (So? Reader is unsure of your point.)
- Tom’s a real pain, and he pays his bills. (So? Reader is unsure of your point.)

Positioning your ideas for emphasis becomes more complicated the longer your sentence grows and the more linking words you add. Most simple sentences follow the subject-verb-object order. In such sentences, the subject gets the most emphasis, then the verb, and finally the object.

The most emphatic position in a complex sentence is at the end. The next most important position is the sentence beginning. The least important spot in a complex sentence is in the middle.

Low-voltage heaters (80V) are used in cases where the heating elements will be attached to the vessel wall. (Emphasizes where the heating elements are attached.)

In cases where the heating elements are attached to the vessel wall, low-voltage heaters (80V) are used. (Emphasizes the use of low-voltage heaters.)

In cases where numerous branched cracks are present, the chance for complete removal of all cracks is diminished. (Emphasizes that the chance for removal is diminished.)

The chance for complete removal of all cracks is diminished
in cases where numerous branched cracks are present. (Emphasizes the cases of numerous branched cracks.)

The reasons for our analysis, which we will detail on page 6, involve money and timing. (Emphasizes money and timing.)

The reasons for our analysis, which involve money and timing, are detailed on page 6. (Emphasizes the location of the details—page 6.)

Now let's put both ideas together—links and sentence positions. The following sentences illustrate proper and improper subordination.

Improper:

The crane barge will be put in position, and the old dolphin decking will be cut and removed from the jacket structure.

Proper:

With the crane barge in position, the old dolphin decking will be cut and removed from the jacket structure.

Improper:

CRA material is highly susceptible to mechanical damage, and operators must follow the correct handling procedure prior to any pipe or accessory movement.

Proper:

Because CRA material is highly susceptible to mechanical damage, operators must follow the correct handling procedure prior to any pipe or accessory movement.

Improper:

The summary is in the appendix and corrects earlier miscalculations by our investigators.

Proper:

The summary in the appendix corrects earlier miscalculations by our investigators.

Improper:

Put a magnetic penetrater on the pipe OD. Apply the particle bath to the penetrater head. The residual magnetic field strength must be strong enough to show a clear indication on the penetrater. It should be viewed under a blacklight. The indication must be oriented perpendicular to the direction of the field. Each joint must be checked with a penetrater.

Proper:

With a magnetic penetrater on the pipe OD, apply the particle bath to the penetrater head. The residual magnetic field strength must be strong enough to show a clear indication on the penetrater when viewed under a blacklight. The indication must be oriented perpendicular to the direction of the field. Each joint must be checked with a penetrater.

Avoid linking your ideas randomly. Determine your most important idea and place it in the most emphatic part of the sentence. Link the minor ideas to that key idea with subordinating words to show the proper relationship, such as time, equality, or cause and effect (see as shown in Figure 6–1).

### 6.3 Non Sequiturs and Illogical Gaps

*Each idea should logically build on the preceding ideas. The reader shouldn't be left with a "So what does that have to do with what you just said?" feeling.*

*Non sequitur* is a Latin phrase meaning "It does not follow." Suppose you are watching a dramatic movie on TV. Your attention is totally...
absorbed by the action. Then the screen goes black and the sound is muffled with static. When the picture and dialogue resume, it’s apparent you have missed something.

Readers often have the same frustrated feeling about ideas strung together without an apparent connection. In such cases, they are inclined to respond, “So what? I don’t get your point.” Consider the following examples.

Margaret makes an enormous salary, and she drives an older model Ford. (So what’s the point?)

Margaret makes an enormous salary, but she drives an older model Ford. (Probably the point is that even though she could afford any model she wanted, she doesn’t have much interest in prestigious cars.)

John is divorcing Mary, and he took her to lunch. (So what’s the point?)

Even though John is divorcing Mary, he took her to lunch. (Probably the point is that they are still associating with each other.)

Such gaps in logic are much easier to detect in someone else’s writing than in our own because writers are familiar with their subject matter. In any piece of technical writing, the ideas and the logic behind them probably seemed clear to the writer or he or she wouldn’t have expressed them in such a way.

Consider the following:

Corrosion pitting may be detected during the inspection. Pipe with excessive pitting and sharp gouges shall not be proved up with an ultrasonic thickness gauge and should be set aside.

Compare:

Corrosion pitting may be detected during the inspection. If excessive pitting or sharp gouges are found, the pipe shall not be proved up with an ultrasonic thickness gauge. Instead, the damaged pipe should be set aside.

The following is very confusing:

The testing equipment mentioned in the specifications costs $10,480. A Bithurg Labs representative has proposed to re-evaluate the test results on our first samples. (So what’s the point, the connection?)

But rewritten, the message is evident:

The testing equipment mentioned in the specifications costs $10,480; therefore, we may decide to wait before purchasing that new equipment. A Bithurg Labs representative has proposed to re-evaluate the test results on our first samples to determine if the equipment was the cause for the discrepancies.

Make sure you leave no cracks between ideas for your reader to fall through and lose your line of reasoning.

6.4 Incomplete and Run-on Sentences

Every sentence must have a subject and verb and express a complete thought. As a general rule, keep one major idea to a sentence.

Fragments are careless errors usually created when writers glance over their words and see a subject and verb and assume they’ve finished the initial thought. A subject and verb alone do not a complete sentence make. If you remember from Section 6.1, a dependent clause has a subject and verb, but it does not express a complete thought.

Each of the following clauses has a subject and verb, but none expresses a complete thought without being linked to another idea: The lead-ins that often signal fragmentary thoughts are in bold print:

The fact that the 730 scans the entire page while loading only the windowed area into memory. (What about this fact?)

Interpretive or thematic maps, which use data like population, income, and sales statistics to analyze the characteristics of an area. (What about these maps? The which clause adds a subordinate idea, but the writer has not finished the main thought about interpretive or thematic maps.)

Because the extensive collection of library functions has been expanded for greater compatibility with UNEX System 2 and the TASI standard to provide a header file. (What is because?)
Although the magnetic field indicator is intended for use as an aid in determining the presence of magnetic fields and the direction of the lines of magnetic flux. (Although this, what?)

Deets Engineering, Inc., being solely oriented in the area of customer representation and customer services to provide quality control of oil and gas tubular goods and wellhead equipment. (What else about Deets Engineering, Inc.?)

First, by reviewing your individual safety programs utilized in your rig operations, and second, by reviewing your safety performance numbers submitted with each bid. (Then what? What happens by doing this reviewing?)

Just as confusing as incomplete sentences are the ones that run on and on and on and on—with too many ideas jammed together as if they constituted a single thought. "I am sick with a high fever I am going home” is a run-on sentence. Here are other examples:

Electromagnetic inspection (EMI) is the generic name for a common flaw-detection method used on OCTG products the principle of EMI is similar to magnetic particle inspection except that leakage fields near flaws are detected electronically instead of visually. (A period is required after products.)

The evaluation branch performs research and development to provide the USAF with advanced reliable and sensitive nondestructive inspection and evaluation techniques, and the NDE techniques satisfy pertinent inspection, evaluation, and quality assurance requirements and solve problems that arise in the production and in-service maintenance of USAF weapon systems, and sophisticated computer technology plays a key in such areas as signal processing, flaw characterizations and image construction/enhancement, inspection scanning control, and accept-reject decisionmaking. (This run-on sentence should be broken into three sentences.)

For single-phase problems that involve pure water, the natural choices for dependent variables are pressure and temperature, however, these variables are unsuitable for problems involving two-phase conditions where they become dependent on each other through the vapor-pressure curve. (A period is required after temperature. The thoughts on both sides of however are complete thoughts, and the sentence should be divided into two.)

Many writers get confused about run-on sentences that use connective adverbs such as however, therefore, hence, and thus. Commas are strong enough to separate two complete thoughts joined by and, but, for, or, so, or yet. But the longer connective adverbs cited above require a semicolon before them when the words on each side of the connective express a complete thought.

Incorrect:

They have provided quantitative information on rates of natural recharge and discharge, however, Figure 4 shows temperature and pressure distribution calculated for a 2D vertical section. (A run-on sentence. Either add a semicolon before however, or insert a period and start a new sentence with however.)

Correct:

Before adding the fluid, however, check the temperature. (However here is just an interrupter. The phrase preceding it does not make complete sense by itself.)

Either fragments mistaken as sentences or too many thoughts jammed together into one sentence make your writing unacceptable. Keep one major thought to a sentence—but make sure that thought is complete.

6.5 Parallel Structure

Structure sentences so that you express equal ideas in similar ways, using all verbs, all prepositional phrases, all adjectives, and so forth.

Actors and actresses often bicker over who gets top billing in a movie—who's the star and who's the co-star, who gets his or her name in two-inch letters and who must settle for half an inch.

Think of parallelism in this way. Two or more equal ideas in one sentence are fighting for the reader's attention, and you as the writer must treat them impartially. The equal ideas can be expressed with prepositional phrases, adverbial clauses, adjectives, or whatever; the forms of expression simply must match.

Consider the following examples of parallel and nonparallel structures.
Nonparallel:
The technicians (1) solved the two-dimensional heat transfer problem by use of a finite element method, (2) have identified a set of three liquid crystal blends, (3) have obtained an estimate for \( w \) by direct measurement of the width, and (4) developed a method for combining the color mappings.

Parallel:
The technicians (1) solved the two-dimensional heat transfer problem by use of a finite element method, (2) identified a set of three liquid crystal blends, (3) obtained an estimate for \( w \) by direct measurement of the width, and (4) developed a method for combining the color mappings. (Each item begins with the main verb.)

Nonparallel:
The two major limitations of the method are a limited sensitivity and that it is dependent on experimentally determining the width of the flaw directly from a liquid crystal color pattern.

Parallel:
The two major limitations of the method are that its sensitivity is severely limited and that it is dependent on experimentally determining the width of the flaw directly from a liquid crystal color pattern. (Two that clauses.)

Parallel:
The two major limitations of the method are its sensitivity and its dependency on experimentally determining the width of the flaw directly from a liquid crystal color pattern. (Two noun phrases.)

Writing a nonparallel sentence is like wearing a brown shoe and a blue shoe to work.

6.6 Dangling Constructions

*Descriptive words, phrases, and clauses tell more about another word or group of words in the sentence. The words that are modified must be on the page, not just in the writer's mind.*

Almost any construction can become a dangler if the word or idea it modifies does not appear in the sentence. Some of the more common dangling constructions follow.
6.7 Commas That Change Meaning

Commas set off nonessential phrases and clauses from the rest of the sentence. Words and phrases that restrict or qualify the meaning of the words around them should not be set off with commas.

Commas can dictate meaning.

In the 1984 presidential election, the Republicans argued for two days over whether this statement from their platform should contain a comma: The Republicans oppose "any attempts to raise taxes which would harm the recovery."

In the previous statement, the door to raising taxes remained open. That is, the Republicans were opposed to raising harmful taxes, but they could decide to raise some taxes they thought would not harm the recovery.

Adding a comma to the sentence after taxes closed the door: The Republicans oppose "any attempts to raise taxes, which would harm the recovery." The latter statement means that any raise in taxes would harm the recovery.

If commas can play havoc in the hands of politicians, think what they can do in the hands of technical writers.

To conquer the most dangerous comma clarity problem, remember this general principle: Placing commas around a particular phrase or clause means that you can leave out the part set off by the commas and still keep the sentence meaning intact. Omitting commas around a particular phrase or clause means that those words are essential to the meaning of the entire sentence. Without commas to cut those words away, that essential phrase or clause qualifies or restricts the meaning of the rest of the sentence.

Consider the meaning of the following sentences with and without the commas.

Essential:

The new deck that has already been fabricated and assembled includes the new mooring gear. (The that phrase specifies which deck.)

Nonessential:

The new deck, which has already been fabricated and assembled, will be lifted and installed next month. (The which phrase adds nonessential information.)

SENTENCE STRUCTURE

Essential:

There are 28 companies actively producing the injection-molded parts that we have considered using in our design. (The that clause tells which parts.)

Nonessential:

There are 28 companies actively producing the injection-molded parts, which we have considered using in our design. (The which clause expresses an afterthought.)

Essential:

The RMP maps have been redesigned to show the Hogan fields where we have already drilled. (Specific Hogan fields are indicated—the ones where we have drilled as opposed to the ones where we have not yet drilled.)

Nonessential:

The RMP maps have been redesigned to show the Hogan fields, where we have already drilled. (The where clause expresses an afterthought, the idea that we have drilled in the Hogan fields.)

Essential:

The three methods that are currently available for modeling the behavior of geothermal reservoirs are decline-curve analysis, the lumped-parameter method, and the distributed-parameter method. (The that clause is essential to the meaning. It specifies which three methods are available.)

Nonessential:

The three methods, which are currently available for modeling the behavior of geothermal reservoirs, are decline-curve analysis, the lumped-parameter method and the distributed-parameter method. (The which clause provides additional information but does not distinguish these three methods from other methods.)

Commas carry clout; use them knowledgeably.
6.8 Misplaced Words, Phrases, and Clauses

Descriptive terms should be placed as close to the words they modify as possible.

The most frequently misplaced words in technical writing are the adverbs almost, only, nearly, just, and even. Such words inserted incorrectly can completely change sentence meaning. Compare the following sentences:

This berthing schedule will only permit construction activities to take place for 48 hours out of every 72-hour period. (The schedule will only permit the activities; that's all the schedule can do.)

This berthing schedule will permit construction activities to take place for only 48 hours out of every 72-hour period. (The schedule restricts construction to two-thirds of the time.)

Only this berthing schedule will permit construction activities to take place for 48 hours out of every 72-hour period. (Only this schedule, as opposed to other schedules, will permit construction activities as specified.)

The adverb just also has the power to alter your sentence meaning by limiting what follows it:

Just Joseph Holland has the authority to revise the specifications on the couplings. (No one else has the authority.)

Joseph Holland just has the authority to revise the specifications on the couplings. (He has authority only, not any ability or expertise in design.)

Joseph Holland has the authority just to revise the specifications on the couplings. (He has authority only to revise.)

Joseph Holland has authority to revise just the specifications on the couplings. (He can revise the specifications only—he cannot revise anything else, such as a brochure, pertaining to the couplings.)

Joseph Holland has authority to revise the specifications on just the couplings. (He cannot revise specifications on items other than the couplings.)

Almost can cause the same problems:

Almost all manufacturers' protectors were able to meet our test criteria in all these areas.

All manufacturers' protectors were almost able to meet our test criteria in all these areas.

All manufacturers' protectors were able to meet our test criteria in almost all these areas.

Misplaced which clauses also create havoc with sentence meaning:

The aluminum housings have been favorably compared with stainless steel inserts, which experience abrasive wear at the entrances and exits. (The inserts experience the wear.)

The aluminum housings, which experience abrasive wear at the entrances and exits, have been favorably compared with stainless steel inserts. (The aluminum housings experience the wear.)

The poron cellular urethane, which must be specified in the client proposal, warrants further consideration as the preferred product. (Poron cellular urethane must be specified in the proposal.)

The poron cellular urethane warrants further consideration as the preferred product, which must be specified in the client proposal. (Whatever product we prefer must be stated specifically.)

Isolate the specific word or phrase you intend to emphasize and then insert the descriptive terms immediately before or after that word or phrase.

6.9 Tense and Mood Changes

Report experimental work and results in the past tense. State facts, hypotheses, and general truths or conditions in the present tense. Don't change tenses or moods unnecessarily. To do so confuses your reader.

Verbs have tense and mood. That is, they show action or existence in either present, past, or future time. Mood reflects whether a state-
ment is factual or conditional, gives a command, or states a strong wish or demand.

*Indicative mood* verbs state facts or ask questions:

Image scaling permits you to enlarge the saved image.
The system prompts you to format a disk.
Should all technical proposals include the May 1 deadline?

*Imperative mood* verbs give commands:

Format the disk before you install the program.
Reduce the pressure by 10 psi every half hour.
Show the data on a bar graph.

*Subjective mood* verbs express things not yet fact, such as conditions, concessions, strong wishes, or demands:

If they accept the proposal, we would begin construction August 2. (Condition)
Our engineers would analyze the samples if they had the proper testing apparatus. (Condition)
The ongoing experiment dictates that the daily data be charted immediately. (Demand)
We urge that the tanks be monitored for hydrogen leaks. (Strong wish)

Report experimental work and results in the past tense; use the present tense for hypotheses, facts, and general truths or ongoing conditions.

Past Work:

We tested the porosity of all products and found Bendine C to be the most suitable for our purposes. (Past tense)

General Truth:

The machinability of prealloyed iron powder with a higher Mn/S ratio improves when various mixes compensate for different strength levels. (Present tense)

Any time you change tenses unnecessarily, the reader becomes confused. Was your result a one-time occurrence or is it a general truth? Is the work completed or still underway? Is the outcome conditional or fact? Correct tense and mood choices prevent confusion. See Figure 6–2 for examples of appropriate tense and mood changes.

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**Proper Use of Tense and Mood**

The Chemstrip bG Test Strips were tested by the procedure listed on the container label. Results were determined by a comparison of the reacted and wiped strip to the color chart on the container label. The results were selected from a list of interpolation levels composed of the colorblock levels and three equally spaced levels in between the colorblock levels. The results of this study are described in three figures. Figure 12 presents a comparison of the two testing products.

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*Figure 6–2. Proper use of tense and mood. The proper use of present and past tense in the same document separates existing conditions from experimental work and improves the clarity of a complicated report.*
7

Precision in Word and Phrase Choices

7.1 Redundant Words and Phrases
7.2 Precise Words and Phrases
7.3 Illogical Comparisons and Ideas
7.4 Jargon: When to Use It and When Not to Use It
7.5 Misused Words and What the Spellchecker Can’t Do
7.6 Unnecessary Foreign Words and Phrases

7.1 Redundant Words and Phrases

Strip redundant words and phrases from your writing. Review your writing for such culprits as noun pairs expressing the same idea, verb add-ons, and other redundancies.

Redundancy in a document is much like stuttering in a speech—both detract from the ideas being presented. That is not to say that all repetition is bad; some writers repeat key phrases and ideas to serve as transitions between parts of a proposal or report and to reemphasize major points.

But redundancy is needless repetition, which has no place in effective writing.

Familiarize yourself with the following lists of common repetitious words and phrases (Figures 7-1, 7-2, and 7-3) so that you can drop them from your own work. Additionally, pay attention to the “categories” of unnecessary repetition so you can recognize redundancy when using words and phrases specific to your own areas of expertise.

<table>
<thead>
<tr>
<th>Paired Words Expressing the Same Idea</th>
</tr>
</thead>
<tbody>
<tr>
<td>subject matter</td>
</tr>
<tr>
<td>goals and objectives</td>
</tr>
<tr>
<td>in this day and age</td>
</tr>
<tr>
<td>period of time</td>
</tr>
<tr>
<td>point in time</td>
</tr>
<tr>
<td>brown in color</td>
</tr>
<tr>
<td>small in size</td>
</tr>
<tr>
<td>cylindrical in shape</td>
</tr>
<tr>
<td>a distance of 220 miles</td>
</tr>
<tr>
<td>the time of day</td>
</tr>
<tr>
<td>200 words in length</td>
</tr>
</tbody>
</table>

Figure 7-1. Paired words expressing the same idea. Use one or the other of each pair, but not both.
**7.2 Precise Words and Phrases**

*Say what you mean—exactly. Repeating key words or phrases is preferable to using alternatives that distort what you intend to say.*

The following paragraph (with names changed) is part of a memo from a client:

On page nine of Section I of your report, you commented that RWW has not charged the Venture for any amounts related to the “cost of money for facilities capital.” John Duke of RWW has asked me to request that you clarify the meaning of the above-mentioned “cost of money for facilities capital” and additionally that you review the concept for the Far East operation.

When pointing out imprecise words to an engineer or geophysicist, frequently we hear the response, “But wouldn’t it be clear in context?” No! The answer is almost always no. In the previous memo, why didn’t the writer just say “interest on the real estate loan for the Tudor Lab” (or whatever) rather than the vague “cost of money for facilities capital”?
Don't Write:
major-incident response unit
technical exposures
limited resources
educational venture
several factors
bad weather
transportation systems
storage facilities
environmentally controlled
nurturing unit

You Could Be Specific:
ambulance, police car
error in the software
limited staff, expertise, money
seminar, correspondence course
cost, manpower, and safety
hurricane
pipelines
warehouse, disk space
chemical-free
parent

Some writers use less precise words as they move through their reports because of an idea from one of their English teachers who said, "Don't keep repeating the same word over and over—choose a synonym." The teacher admonished students to switch from house to cottage to dwelling to residence.

Let's give English teachers credit for helping students build a large vocabulary. But that's terrible advice for the technical writer. Once you have chosen the most precise word, stay with it. Repeating an effective, precise word is preferable to using a vague alternative. If, however, you can use alternative words without losing precision and creating confusion, by all means do so.

Additionally, to be precise means to understand both the denotation and the connotation of the words and phrases you choose.

Some words can be taken either positively or negatively—and will be, according to the experience and background of the reader. Consider this series of near synonyms: surprising, interesting, novel, amusing, and revealing (see Figure 7–4 for others). Such word choices often leave translation open to readers, which is usually a dangerous thing to do.

To summarize: Simple, concrete words and phrases lead to effective writing.

---

<table>
<thead>
<tr>
<th>Denotation and Connotation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neutral</strong></td>
</tr>
<tr>
<td>temporary</td>
</tr>
<tr>
<td>strong</td>
</tr>
<tr>
<td>initial</td>
</tr>
<tr>
<td>odorous</td>
</tr>
<tr>
<td>inherent</td>
</tr>
<tr>
<td>shelter</td>
</tr>
<tr>
<td>change</td>
</tr>
<tr>
<td>imitation</td>
</tr>
<tr>
<td>altered</td>
</tr>
<tr>
<td>firm</td>
</tr>
<tr>
<td>residence</td>
</tr>
<tr>
<td>satisfactory</td>
</tr>
<tr>
<td>end</td>
</tr>
</tbody>
</table>

Figure 7-4. Denotation and connotation. Be aware of unintended shades of meanings in the word you use.

7.3 Illogical Comparisons and Ideas

_Think about the logic of words strung together and make sure they say what you mean._

Some technical writers struggle so long with a sentence that once they get the prepositional phrases and the adverbial clauses tucked into some out-of-the-way place, they fail to consider the logic of the sentence in its entirety.

To illustrate the common weakness of illogical comparisons and ideas, here are a few classics collected over the years:

I want to take a day out of your time to discuss this. (Not if I can help it! A day out of my schedule perhaps.)
The appreciation of a host-controlled environment will become not only the best way but the only way to implement complexity of a distributed network. (Is the appreciation a way? Why would they want to implement complexity—job security?)

The question may no longer be valid for all brick walls—changes in construction materials and methods jeopardize its truthfulness. (How is it possible for a question to be true? An answer can be, but not a question.)

A clear understanding of the conversion that will take place is illustrated by the diagrams that follow. (The understanding is illustrated? They have a diagram of brain waves?)

The following list of security coordinators has authority to write policy statements. (The list is going to write the statements? Does that mean the coordinators themselves can go home?)

Also illogical, although perhaps not obviously so to many writers, are comparisons of adjectives such as unique, extinct, fatal, matchless, priceless, and permanent. Something is either unique or it isn’t. One stab wound cannot be more fatal than another. Taxes are more permanent than death? Such comparisons show a basic misunderstanding of word meanings.

Finally, avoid incomplete or ambiguous comparisons.

Incomplete:

Our site readings varied more than your chemist.

Complete:

Our site readings varied more than those taken by your chemist.

Incomplete:

The workflow in Diagram 6 is more complex than Diagram 7.

Complete:

The workflow in Diagram 6 is more complex than that shown in Diagram 7.

To write clearly, you have to think clearly. Logic counts—in sentence construction as well as in research.

7.4 Jargon: When to Use It and When Not to Use It

When writing to professionals with technical backgrounds similar to yours, you may use the technical language of your field. When writing to a general audience, particularly decision makers with limited expertise in your technical field, avoid such jargon and select the simplest accurate words or phrases to express your ideas.

To really outstanding scientific writers and thinkers, jargon is out of place most of the time:

Most of the fundamental ideas of science are essentially simple, and may, as a rule, be expressed in a language comprehensible to everyone.
—Albert Einstein, The Evolution of Physics

If you cannot—in the long run—tell everyone what you have been doing, your doing has been worthless.
—Erwin Schrödinger, Science and Humanism

Even for a physicist, the description, in plain language, will be a criterion of the degree of understanding that has been reached.
—Werner Heisenberg, Physics and Philosophy

Although Webster’s dictionary defines jargon as “the technical terminology or characteristic idiom of a specific activity or group,” jargon has a negative connotation for most people. The term has come to mean obscure and often pretentious language used in an attempt to impress rather than to express.

We wouldn’t dare to say that technical writers should or even could eliminate all the jargon from their writing. But we do think jargon should be used only sparingly in reports, proposals, and manuals intended for broad audiences with varying degrees of technical expertise.

Let clarity and consideration for your audience be your guides.
7.5 Misused Words and What the Spellchecker Can’t Do

*Awareness is the key to correcting misused words in your writing.*

Mark Twain put it this way: “The difference between the right word and the almost-right word is the difference between lightning and the lightning bug.” Never mind that Archie Bunker and Yogi Berra both became famous partly because of their malapropisms. Misused words hit readers like the proverbial bolt of lightning. Consider, for example, these sentences we recently discovered: “I will keep you posted on the action as it accrues” and “It was successful because of the limited marketing expense occurred in developing the revenue source.”

The list of almost-right words is endless. We’ll begin with a common misuse of *versus*. Writers often misuse *versus* or *vs.* to mean *and, or, or as compared to*. The correct meaning is *against* or *opposed to*. A paper entitled “In-house Sampling Programs versus External Sampling Programs” should be about differences, not similarities, in the two kinds of sampling programs.

Unfortunately, computer spellcheckers can’t always help with such problems. They don’t, for example, catch the misused *operative* for *operational, affect for effect, or insure for ensure.*

To rid your own writing of such mistakes, examine the list of commonly misused words given in Figure 7–5 and make a mental note of them for your next writing project. Add to the list your own frequently misused words and verify each use in your writing.

### Commonly Misused Words

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>adapt</td>
<td>to adjust</td>
</tr>
<tr>
<td>adept</td>
<td>proficient</td>
</tr>
<tr>
<td>adopt</td>
<td>to choose</td>
</tr>
<tr>
<td>affect</td>
<td><em>verb:</em> to influence or to involve</td>
</tr>
<tr>
<td>effect</td>
<td><em>verb:</em> to cause; <em>noun:</em> a result</td>
</tr>
<tr>
<td>alternative</td>
<td><em>noun:</em> another choice</td>
</tr>
<tr>
<td>alternate</td>
<td><em>verb:</em> to repeat in a regular cycle</td>
</tr>
<tr>
<td>amount</td>
<td>applies to mass or bulk quantities</td>
</tr>
<tr>
<td>number</td>
<td>refers to separate units that can be counted</td>
</tr>
<tr>
<td>apt</td>
<td>suited, pertinent; inclined to; prompt to learn</td>
</tr>
<tr>
<td>liable</td>
<td>responsible for consequences</td>
</tr>
<tr>
<td>likely</td>
<td>probable</td>
</tr>
<tr>
<td>cite</td>
<td><em>verb:</em> to give a reference, award, or traffic ticket</td>
</tr>
<tr>
<td>sight</td>
<td><em>noun:</em> eyesight; <em>verb:</em> to see for the first time</td>
</tr>
<tr>
<td>site</td>
<td><em>noun:</em> a location</td>
</tr>
<tr>
<td>continual</td>
<td>regular, but interrupted</td>
</tr>
<tr>
<td>continuous</td>
<td>constant and uninterrupted</td>
</tr>
<tr>
<td>data</td>
<td>plural when used to refer to facts or various pieces of information; singular when used to refer to a body of information</td>
</tr>
</tbody>
</table>

*Figure 7–5. Commonly misused words. Misused words mislead your audience. Awareness is the key to deleting them from your writing.*

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<table>
<thead>
<tr>
<th>Commonly Misused Words (continued)</th>
</tr>
</thead>
</table>

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Figure 7–5 (continued)

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75
### Commonly Misused Words (continued)

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>datum</td>
<td>archaic singular of data; a level surface or line used as a reference for measuring elevation</td>
</tr>
<tr>
<td>devise</td>
<td><em>noun</em>: a plan, procedure, technique, or object</td>
</tr>
<tr>
<td>disinterested</td>
<td><em>verb</em>: to plan or to design</td>
</tr>
<tr>
<td>uninterested</td>
<td>impartial</td>
</tr>
<tr>
<td>farther</td>
<td>use for distance</td>
</tr>
<tr>
<td>further</td>
<td>use except for distance</td>
</tr>
<tr>
<td>fewer</td>
<td>use when quantity can be counted</td>
</tr>
<tr>
<td>less</td>
<td>use with quantity that cannot be counted</td>
</tr>
<tr>
<td>infer</td>
<td>listener or reader infers</td>
</tr>
<tr>
<td>implies</td>
<td>speaker or writer implies</td>
</tr>
<tr>
<td>material</td>
<td><em>noun</em>: composition of something; <em>adjective</em>: pertinent</td>
</tr>
<tr>
<td>materiel</td>
<td>equipment, apparatus, supplies, inventory</td>
</tr>
<tr>
<td>may</td>
<td>indicates possibility</td>
</tr>
<tr>
<td>might</td>
<td>possibility, but indicates more uncertainty than may</td>
</tr>
<tr>
<td>operative</td>
<td>working</td>
</tr>
<tr>
<td>operational</td>
<td>ready to work</td>
</tr>
<tr>
<td>perspective</td>
<td>viewpoint</td>
</tr>
<tr>
<td>prospective</td>
<td>likely to become; expected</td>
</tr>
</tbody>
</table>

### Commonly Misused Words (continued)

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>plain</td>
<td><em>adjective</em>: simple, ordinary; <em>noun</em>: flat, treeless countryside</td>
</tr>
<tr>
<td>plane</td>
<td><em>noun</em>: airplane, geometric surface, a tool; <em>verb</em>: to smooth or flatten</td>
</tr>
<tr>
<td>practical</td>
<td>useful or workable as opposed to theoretical</td>
</tr>
<tr>
<td>practicable</td>
<td>possible to practice or perform, feasible</td>
</tr>
<tr>
<td>precede</td>
<td>to go before</td>
</tr>
<tr>
<td>proceed</td>
<td>to move ahead</td>
</tr>
<tr>
<td>stationary</td>
<td>immobile</td>
</tr>
<tr>
<td>stationery</td>
<td>writing material</td>
</tr>
</tbody>
</table>

**Figure 7–5 (continued)**

#### 7.6 Unnecessary Foreign Words and Phrases

*The trend in both business and technical writing is to avoid foreign words and phrases. Use such words and phrases only if there is no good English equivalent.*

Technical writing workshop participants frequently ask us to clarify the difference between *e.g.* and *i.e.* If so many technical professionals misunderstand the difference between the two, why use them? Why not write *for example* or *that is*?

*Et cetera*, meaning "and others of the same kind," is another frequently misused term.

Inappropriate:

In the meeting with the client you will need to bring your lab notebook, printouts of our analysis, etc.
What's the et cetera? A goat? Maybe a pail of water? This sentence establishes no clear pattern with which to identify what is to follow. Rather, the use of the term shows lazy thinking.

Appropriate:

Table 6 clearly shows that the displacement values have increased in direct proportion to the addition of our Theyal mixture: 3 percent, 6 percent, 9 percent, 12 percent, etc. (A clear pattern is indicated.)

Our advice on foreign words and phrases is to use them only when there is absolutely no English equivalent!
Lists are powerful attention getters. They catch the eye of skimming readers, making it easy to overview and review key ideas. Therefore, use lists to highlight important points. Bulleted lists convey the idea that the listings are not exhaustive. Enumerated lists usually indicate some order, such as a chronological sequence of actions. List items in parallel form and punctuate in one of three ways: as phrases, as individual sentences, or as one sentence with a lead-in.

Lists draw immediate attention to the ideas they present. Did you skim through this book before buying it? If so, your eyes probably were immediately directed to the lists on the pages you skimmed. The list format is like a red flag saying, "This is important, reader." Therefore, use lists to do the following:

- Highlight major ideas in your reports, proposals, manuals, or correspondence
- Break down complex information into smaller, more manageable chunks
- Overview key information quickly
- Review key information quickly

On the other hand, the misuse of a list for unimportant information confuses readers. If they find minutiae too often in a list format, readers become distrustful of all your lists.

Overuse is another abuse of the list format. Any technique for emphasizing—whether boldfacing, underlining, or italicizing—loses its effectiveness if overused.

Bullets or Numbers?

To set off items in a list, use either bullets or numbers. Bulleted lists indicate items that do not necessarily constitute an exhaustive listing or are perhaps separate ideas altogether. Enumerated lists most often convey a chronological sequence, such as a sequence of actions.

Parallel Structure

For faster reading and skimming, make sure that each item in a list is in parallel form. That is, all items should be either sentences, phrases, or words. Also, items should begin alike—either all verbs, all adjectives, all nouns, and so forth. Lists can be in any one of several formats, as shown in Figure 8-1.

Three Ways to Punctuate a Formal List

No End Punctuation on Separate Items

Therefore, use lists for:

- Highlighting major ideas in your reports, proposals, manuals, or correspondence
- Breaking down complex information into smaller, more manageable chunks
- Overviewing key information quickly
- Reviewing key information quickly

End Punctuation on Complete Sentences

Why use lists?

- Major ideas can be highlighted in your reports, proposals, manuals, or correspondence.
- Complex paragraphs can be broken down into smaller, more manageable chunks.
- Key information can be quickly overviewed.
- Key information can be quickly reviewed.

Punctuation as One Long Sentence

Use lists to present:

- Major ideas in your reports, proposals, manuals, or correspondence
- Complex information in smaller, more manageable chunks
- Key information for quick overview
- Key information for quick review

Figure 8-1. Three ways to punctuate a formal list. Items in a list should be in parallel form, but there can be variety in format and punctuation.

How to Punctuate Formal and Informal Lists

When punctuating a formal list, you have three choices: (1) no end punctuation on the separate items, (2) end punctuation for all items that are complete sentences, and (3) punctuation that makes the list
lead-in and all separate items into one long sentence. You do not have
the option, however, to skip from one format to another in the same
list. The first sentence in this paragraph is an example of an informal
list—one not set off with indentation or bullets. See Figure 8–1 for
eamples of how to punctuate a formal list.

Analogies
When to Use Them
and How to Develop Them
12

Passive Style Versus Direct Style

12.1 Do Technical Writers Have a Writing Style?
12.2 Negative News
12.3 Active Voice Versus Passive Voice
12.4 Buried Verbs, Buried Subjects, Buried Action
12.5 I, We, One, and the Disappearing Writer
12.6 Hedging: Qualifiers, Intensifiers, Vague Abstractions
12.7 Strong and Simple Versus Bland and Complex

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12.1 Do Technical Writers Have a Writing Style?

Technical specialists establish their credibility in two ways: (1) with their facts, evidence, and logic and (2) with their writing style. A heavy, academic writing style will not camouflage the fact that a report has nothing important to say. And even good ideas will not travel well when mired in ponderous prose. The mark of a good technical writer is the ability to express a complex idea in a style simple and direct enough for a lay audience to understand.

Your writing style becomes a personal logo. And just as a company's logo consists of artwork, colors, and their arrangement, your writing style has three parts:

- The way you structure your ideas
- The illustrations you select to make your ideas clear and memorable
- The language you use

Other sections of this book deal with the first two parts of style; this section will focus on use of language.

A passive style, though perhaps difficult to define, is nevertheless easy to recognize. Those who write in a passive style bury the meat of their ideas in passive verbs. They select weak sentence subjects. They bury key actions. They add unnecessary qualifiers and intensifiers to vague abstractions. Finally, they drape their ideas in trite, verbose statements. Compare the following two writing styles:

Passive, Indirect Style:

It can easily be seen that when large volumes of gas are metered and when there are variations in the gas temperatures, there is going to be a loss of revenue if some correcting device is not used.

Direct Style:

As large volumes of gas are metered, gas temperature variation will result in lost revenues unless a correcting device is used.
Passive, Indirect Style:

Provided herewith is a report on the remainder of the findings with regard to the Unit #3 turbine. The contents should be consistent with your present requirements, but if further clarification is required, please advise.

Direct Style:

I've enclosed the report on the remainder of the findings on the Unit #3 turbine. If you need further clarification, please let me know.

Passive, Indirect Style:

It should be noted that the results of the Powell #3 workover could change the rankings of the alternative courses of action. Therefore, no further action will be taken toward implementing Case D until the results of this workover are assessed.

Direct Style:

Please note that the results of the Powell #3 workover could change the rankings of the alternative courses of action. Therefore, the Sewind group will take no further action toward implementing Case D until you have assessed these results.

Passive, Indirect Style:

Structured maps which have been contoured on the top of the Blaxton and San Matthews are shown in Figures 3A and 3B, respectively. Similarities exist between the structures of the two zones, with both being elongated carbonate build-ups with the axes following an east-to-west direction. It should be noted that the structures of both zones decline drastically toward the west and along the northern and southern flanks. At the points of structural change, sections located in the lower parts of the San Matthews can be said to become progressively less productive.

Direct Style:

Figures 3A and 3B are structure maps contoured on the top of the Blaxton and San Matthews, respectively. The structures of the two zones are similar. Both are elongated carbonate build-ups with east-to-west axes. Also both zones drop toward the west and along their northern and southern flanks. As the San Matthews changes, lower sections of the structure become progressively less productive.

What makes the first style indirect and passive and the second style direct is the subject of the following sections.

12.2 Negative News

Some writers choose a passive style when they have bad news or when they fear their readers will oppose their conclusions or recommendations. A passive style buries key points and tends to hedge. Writers with a direct style state any results of value, but also point out any failures.

You may have heard the story of the engineer who began his report this way: "We've just recently discovered one more way not to improve our bridge design."

Although this engineer had perhaps taken optimism to the extreme, technical professionals often find ways of placing negative results in a positive light. Many writers tend to view readers as inherently hostile and ready to pounce on them at the least bit of disappointing news or for unorthodox recommendations.

But you should not make such an assumption about your readers out of hand. Disappointment in the outcome does not mean a reader will doubt or criticize your work or conclusions. As long as your work is valid, you should be just as direct and positive in your presentation as when the results are good. Hedging and qualifying bad news tend to detract from credibility.

Negative:

We have no definite list of persons who will be assisting with the program conversion and no specific times of their availability [problem]; therefore, the staff will have difficulty in gaining access to the building [problem].

Positive:

We have only a tentative list of persons who will be assisting with the program conversion and tentative schedules of their availability [problem]; therefore, the staff will need temporary ID's to gain access to the building [solution].
Negative:

Under our present system, we manually attempt to override or accommodate the computer instructions [fact]. But the present method causes severe disruptions of the work flow [problem].

Positive:

Under our present system, we manually override or accommodate the computer instructions [fact]. We can continue to function in this manner with some degree of effectiveness [implied problem]; however, certain changes will improve our system and minimize disruptions to the work flow [solution].

12.3 Active Voice Versus Passive Voice

*Active verbs make your writing direct, clear, and concise. Passive verbs can add variety to your writing, soften commands, place emphasis on results when the doer is unimportant, help doers escape accountability, and slow the pace of your writing. Unless you have one of these reasons for using the passive voice, prefer active voice.*

In sentences in the active voice, the subject performs the action. In sentences in the passive voice, the subject receives the action.

Passive:

The study was completed by our investigators.

Active:

Our investigators completed the study.

Passive:

The design of such systems is simplified by the use of hydraulics.

Active:

The use of hydraulics simplifies the design of such systems.

Passive:

The significance of the makeup and test procedure on the leak resistance of API 8-round connectors is evaluated by a tool that extends the size range from 7 inches to 16 inches.

Active:

A tool that extends the size range from 7 inches to 16 inches evaluates the significance of the makeup and test procedure on the leak resistance of API 8-round connectors.

Passive:

Metallurgical analyses were performed by Brighton, Inc.

Active:

Brighton, Inc. performed metallurgical analyses.

Active Verbs Are Direct

Passive:

It has been suggested that the project be abandoned. (Who suggested it? Abandoned by whom?)

Active:

R&D suggests that Weldon Associates abandon the project.

Passive:

It is recommended that, while the meter is disassembled, a few drops of light instrument oil be placed in the bearings of the magnetic drive shaft.

Active:

While the meter is disassembled, place a few drops of light instrument oil in the bearings of the magnetic drive shaft.

Active Verbs Are Clear

Passive:

New personnel and budget resources have been promised to be committed to well completions in the lower subzones. (Who made this promise?)

Active:

The TRW division has promised to commit new personnel and budget resources to well completions in the lower subzones.
Passive:
The feasibility of extracting bitumen from tar sand with a patented hot water/solvent process will be assessed. (Who will assess it?)

Active:
Our staff will assess the feasibility of extracting bitumen from tar sand with a patented hot water/solvent process.

Active Verbs Are Concise

Passive:
The two main bearings can be lubricated by means of the external container [13 words].

Active:
The external container can lubricate the two main bearings [9 words].

Passive:
If coasting time has failed to reach the charted times, tests must be performed to determine where the increased frictional load has occurred [24 words].

Active:
If coasting time has not reached the charted times, test the meter to determine the source of increased frictional load [20 words].

Passive:
This mechanical output is connected to an electrical output by means of the pulse generator [15 words].

Active:
The pulse generator connects the mechanical output to the electrical output [11 words].

The passive voice does, however, have a place in technical writing.

Passive Verbs Add Variety

We placed a viscous, saponified thixotropic crude in the annular space. Next, we preinsulated the injection string with calcium silicate. Then we insulated a concentric injection string that had been in use earlier. Finally, the production casing was prestressed in all wells.

Passive Verbs Soften Commands

The operation of the plotter should be carefully explained to all users before the program is initiated. (It sounds demanding or authoritarian to say “You should carefully explain the operation of the plotter to all users before you begin the program.”)

Passive Verbs Emphasize Results When the Doer Is Unimportant or Unknown

Eighteen types of structures have been encountered in the 54 producing acres of the highly faulted Bengli region. (Who encountered them is unimportant.)

Passive Verbs Allow Doers to Escape Accountability

A quality and location differential of the crude oil will be established to force the buyer to proceed with the acquisition. (This downplays the issue of who will force the buyer.)

The format commands were programmed incorrectly. (This is less accusatory than “You programmed the commands incorrectly.”)

Passive Verbs Slow the Pace of Your Writing

The development of the ROV has not been continuous. Several years elapsed before we recognized and exploited the potential of the original model. This hiatus was profitably filled by diving contractors, who began testing equipment and techniques to improve human endurance in progressively deeper waters, so extending a human’s range from dives using simple air diving equipment at 32 or 65 feet to routine commercial dives with mixed breathing gases beyond 984 feet.

Unless you have one of the above-mentioned reasons for using the passive voice, prefer active verbs to make your writing direct, clear, and concise.
12.4 Buried Verbs, Buried Subjects, Buried Action

Don’t bury important information by turning verbs into noun phrases or by using empty sentence beginnings such as There are, There were, It is, or It was.

We will assume you did good work. Okay, excellent work. Now you want to see some changes or some decisions, right? If so, don’t suffocate your message or recommendations with weak subjects or verbs.

A verb expresses what a subject is, does, or has. Every English sentence has a verb, and verbs are what give sentences life. Yet some writers shy away from using strong, vivid verbs and instead turn them into nouns and noun phrases, making their sentences longer and duller.

In the sentences that follow, note the verbs that have been replaced by noun phrases and other clutter (in boldface).

Cluttered:

The discovery of the Hawkridge Field was a major factor in the production of and the distribution of the product being done so inexpensively.

Strong:

The Hawkridge discovery enabled us to produce and distribute the product so inexpensively.

Cluttered:

Additional analyses were performed with estimates provided by Chicago for the purpose of the identification of supply costs and print volumes that would significantly affect the results.

Strong:

With estimates from Chicago, we analyzed the figures to identify the supply costs and print volumes significantly affecting the results.

Cluttered:

The review of the conversion program should be done first from the overall point of view of the verification of the whole chain.

PASSIVE STYLE VERSUS DIRECT STYLE

Strong:

Review the conversion program first to verify the whole chain.

Another way to take the punch out of a sentence is to give it a false subject. That is, some writers begin sentences with a mundane there is, there are, there was, there were, it is, or it was rather than the true subject.

Weak:

There is a recent exception to the assumption of subsea maintenance, Jabiru No. 2A.

Improved:

Jabiru No. 2A is a recent exception to the assumption of subsea maintenance.

Weak:

There were two systems on board, each housed in a separate cage for over-the-side deployment.

Improved:

The two systems on board were each housed in a separate cage for over-the-side deployment.

Weak:

It is always very important to establish methods and procedures to determine that all metering is done accurately.

Improved:

Establish methods and procedures to ensure that all metering is accurate.

Weak:

It can be seen that the temperature effects are negligible.

Improved:

The temperature effects are negligible.

Give your sentences life. Sentences that begin with their “real” subjects and use active verbs add impact to your ideas.
12.5 I, We, One, and the Disappearing Writer

Use personal pronouns when you need them to be clear. Objectivity involves much more than third-person prose.

In teaching technical writing, we hear no question more often than “What about using personal pronouns? In school, we were taught to avoid I, we, and you. Doesn’t the writing sound more objective without them?”

Objectivity has little to do with the use of pronouns. An editorial in the Wall Street Journal might use no personal pronouns, but certainly you realize you’re not getting an unbiased opinion. Writers show objectivity (or lack of objectivity) by the facts they choose to include or to omit, by their choice of subject, by their sampling and testing procedures, and by their conclusions. Writing style and the use of personal pronouns is altogether different from scientific objectivity.

Note the use of personal pronouns in this passage from The New England Journal of Medicine (boldface added):

Our findings concerning the overall incidence of acute and chronic GVHD are not appreciably different from those of other groups. Patients with Grades 0 through I acute GVHD fared better than those with more severe involvement, the latter group having a higher incidence of fatal infection. In this series, we found no association between acute GVHD and a reduced risk of posttransplantation relapse. However, as in other recent reports, we did find an association between the presence of chronic GVHD and a low relapse rate.¹

When you’re talking about work you did, I or we is perfectly proper. The ubiquitous the authors and the writers sound pompous, stuffy, and distant. Of course you wouldn’t say we if you’re speaking only for yourself rather than as a representative of a team or an organization. In general, state theories or facts in the third person; report your work as if you did it.

Outside of these two considerations, let clarity and effectiveness be your guide.


12.6 Hedging: Qualifiers, Intensifiers, Vague Abstractions

Hedging weakens the impact of your writing. Qualifiers, intensifiers, and vague abstractions overshadow key ideas.

Just as nature abhors a vacuum, engineers abhor a situation in which they might be pinned down to a black-and-white, this-or-that answer. We know that God ordained and set in motion a universe of great precision. Yet when we mortals try to measure and describe it, we are beset with nagging inconsistencies. Thus, we become equivocators, hedgers, and weaslers. We squirm because we know that if we’re too specific, someone may come along later and prove us wrong. We vividly imagine ourselves standing before the ranks of our peers and having our badge of office, the plastic vest-pocket pencil holder, summarily ripped out after our slide rule snaps across the knee of the commandant. We are left to wander as forlorn and pitiful objects of scorn.

In the face of this predicament, equivocation becomes insurance. Hedging makes our position fluid enough to flow with future findings. In technical terms, the viscosity of the position is inversely proportional to the number of weasel words in the statement. Who among us has not encountered the “expert” who knew so much he or she couldn’t answer a question?

On the other hand, you’ll be quick to point out, simplistic solutions frequently emanate from simple minds. How, then, does one reach that balance between cowardly hedging and unsupported hype? State your points as emphatically as you can support them. No more, no less. If you’re not sure, don’t hedge. Simply state your level of uncertainty and the reasons behind it as straightforwardly as possible. Management will love you. Your peers will respect you.

To be sure, though, hedging does have its place; its value is limitless if you need to cover weaknesses in effort or logic. During the first technical writing workshop for the research and development section of a client company, a participant brought us the following “glossary of terms,” saying that if we wanted to work for his company, we’d have to learn to interpret its reports:

It has long been known . . . (Translation: I haven’t bothered to look up the original reference.)
Of great theoretical and practical importance ... (Translation: Interesting to me.)

Three of the samples were chosen for detailed study. (Translation: The results of the others didn’t make sense so we ignored those.)

Typical results are shown. (Translation: The best results are shown.)

These results will be reported at a later date. (Translation: I might get around to this sometime.)

An exhaustive review of recent literature shows ... (Translation: I found a 1962 paper that says ...)

It is believed that ... (Translation: I think.)

It is generally believed that ... (Translation: A couple of other people think so, too.)

It is clear that much additional work will be required before a complete understanding ... (Translation: I don’t understand it.)

Thanks are due to Joe Glotz for assistance with the experiment and to John Doe for valuable discussions. (Translation: Glotz did the work and Doe explained what it meant.)

The original author of this list is unknown, but he or she evidently had been reading the same kind of reports we see.

Hedging and vague abstractions abound everywhere—even in sales. A third-party investigator of investment real estate brought us a copy of his standard report for clients who ask him to inspect property before they buy it. In a four-page client report, five disclaimers insist that the investor should make his or her own decision about purchase of the property because all investigative findings presented in the report are based on “appearance.”

When we suggested that the investigator add only one blanket disclaimer at the end of the report, he grew concerned that it wouldn’t be “enough.” The disclaimers were equivalent to saying “Don’t count on this report—I’m not standing by anything at all that it might say.” And this report was intended to be a sales tool!

So what to do if you have qualifications to make? At the outset, state clearly the scope of your work, the specifications, and the assumptions. Then be straightforward in your conclusions and recommendations. If you’re not sure about a point, say so. Some of the qualifiers, intensifiers, and vague abstractions found most often in technical writing are included in Figure 12–1. Remember that human nature leads us to interpret vague words and phrases negatively. Additionally, such writing sounds unclear and dull and suggests the writer is afraid to take a stand.

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**Qualifiers, Intensifiers, Vague Abstractions**

**Qualifiers**
- to some degree
- to some extent
- reasonably
- considerable
- appears
- more or less
- rather
- tolerable
- generally
- commonly
- seems
- significantly
- primarily
- largely
- may possibly
- perhaps
- apparently
- should be

**Intensifiers**
- very
- absolutely
- so
- quite
- purely
- especially
- genuinely
- extremely
- well under
- well over
- completely
- simply

**Vague Abstractions**
- various factors (scheduling? personnel? money?)
- several approaches (to an airport runway?)
- similar types (similar in cost? in materials?)
- facilities (warehouses? toilets?)
- units (pencils? lots? buildings?)
- in this manner
- in this mode
- in this fashion
- has various capabilities to
- quite a few
- a number of
- a small amount
- a significant amount

---

Figure 12–1. Qualifiers, intensifiers, and vague abstractions. Be straightforward and confident in your writing. Hedging and vague qualifiers overshadow key ideas.
12.7 Strong and Simple Versus Bland and Complex

Precise, simple words will make your writing powerful.

It is often said that API standards compose the “Bible” for the conduct of business in the oil patch. There is a certain truth to this idea: Everyone considers it sacred literature, but no one seems to read it.

Although a humorous analogy makes a memorable point, colorful writing does not require you to be a comic in your reports and correspondence. Colorful writing does, however, mean that you select words, expressions, and figures of speech that add impact to your ideas.

Use big words only when there’s no small word with the same meaning or when you purposely want to confuse your reader. As soon as a trendy word is coined, it’s on its way to becoming a cliché. Instead of making your writing colorful, such clichés make it trite.

An engineer once brought us a draft of a memo he had been struggling to write for two days. After reading it, we commented that it sounded fine, that it was both clear and concise. “Yeah,” he responded, “but it just doesn’t sound businesslike—I have a hard time writing in a businesslike style.”

Anyone who’s laboring under the false impression that “businesslike,” “technical,” “official,” or “objective” means using the longest sentences and the biggest words possible can relax. Readers are impressed by ideas and the work they represent, not a heavy academic writing style that puts even the most interested and intelligent to sleep.

Unfortunately, some technical writers work hard to turn simple, strong words into bland, complex substitutes (see Figure 12–2).

Bland writing means unnecessarily big words and clichés that make all of your documents sound as though they’re written on a computer with limited disk space. Words and phrases that easily slide onto your page are probably clichés that need to be replaced by more precise, up-to-date terms (see Figure 12–3).

A comparison of the bland and the colorful can be illustrated better than explained:

<table>
<thead>
<tr>
<th>Complex</th>
<th>Simple</th>
</tr>
</thead>
<tbody>
<tr>
<td>aggregate</td>
<td>sum, total, whole</td>
</tr>
<tr>
<td>anomalous</td>
<td>unusual</td>
</tr>
<tr>
<td>antithesis</td>
<td>opposite</td>
</tr>
<tr>
<td>abbreviate</td>
<td>condense</td>
</tr>
<tr>
<td>cessation</td>
<td>stop, end</td>
</tr>
<tr>
<td>cognizant</td>
<td>aware</td>
</tr>
<tr>
<td>commencement</td>
<td>beginning</td>
</tr>
<tr>
<td>concept</td>
<td>idea</td>
</tr>
<tr>
<td>conjecture</td>
<td>guess</td>
</tr>
<tr>
<td>demonstrate</td>
<td>show</td>
</tr>
<tr>
<td>disengage</td>
<td>free</td>
</tr>
<tr>
<td>duplicate</td>
<td>copy</td>
</tr>
<tr>
<td>elucidate</td>
<td>clarify</td>
</tr>
<tr>
<td>enumerate</td>
<td>number, list</td>
</tr>
<tr>
<td>facilitate</td>
<td>help</td>
</tr>
<tr>
<td>homogeneous</td>
<td>like, similar</td>
</tr>
<tr>
<td>implement, implementation</td>
<td>put into use, use</td>
</tr>
<tr>
<td>impairment</td>
<td>harm, damage</td>
</tr>
<tr>
<td>incision</td>
<td>cut</td>
</tr>
<tr>
<td>incombustible</td>
<td>fireproof</td>
</tr>
<tr>
<td>initiate</td>
<td>begin</td>
</tr>
<tr>
<td>methodology</td>
<td>methods, procedure</td>
</tr>
<tr>
<td>modify, modification</td>
<td>change</td>
</tr>
<tr>
<td>miniscule</td>
<td>tiny</td>
</tr>
<tr>
<td>opine</td>
<td>think</td>
</tr>
<tr>
<td>optimum</td>
<td>best</td>
</tr>
<tr>
<td>subsequent</td>
<td>next</td>
</tr>
<tr>
<td>sufficient</td>
<td>enough</td>
</tr>
<tr>
<td>terminate</td>
<td>end</td>
</tr>
<tr>
<td>utilize</td>
<td>use</td>
</tr>
<tr>
<td>verification</td>
<td>check, proof</td>
</tr>
</tbody>
</table>

Figure 12–2. Bland, complex writing versus strong, simple writing. The key to strong, lucid prose is simplicity.

large producers of ultraviolet in industry. The ordinary fluorescent lamp generates ultraviolet inside the bulb, but it is almost entirely absorbed by the bulb and its coating. The most common exposure to ultraviolet radiation is from direct sunlight, which can result in sunburn. Also, while most people have become familiar with certain compounds and lotions that minimize the effects of the sun’s rays, many are unaware that some industrial materials, such as cresols, make the skin especially sensitive to ultraviolet rays. So much so that even short exposure results in severe sunburn.

Because of the long cable lengths, the preferred method of installation is center pulling. The cable reel, placed at an intermediate point, is pulled into the conduit. The remainder of the cable is then removed from the reel, laid out in a figure eight pattern to preclude kinking, and pulled by the other end into the second conduit. The advantages of this installation method are a reduced crew size and fewer blowers and trucks.

Generally, text and graphic scanners use one of two methods to capture a page. Some systems transport paper past a window that illuminates the line and projects it onto a charged couple device (CCD), while others move the optics over a fixed scanning bed. Both methods require precise mechanical tolerances, particularly for text scanning. A 1-pixel error per line can trigger an entire page of unrecognized and unwanted characters.

Bland:

The engineering contractor and subcontractors must sponsor the development of a modification design concept which permits all field work and activities on the dock and dolphins to be broken into periods of 48 hours. At the conclusion of each successive 48-hour task, the original mooring capabilities of the facility (utilizing existing and/or new state-of-the-art equipment) must be in a state of restoration. The 48-hour period additionally encompasses any periods of time required for mobilization or demobilization activities and tasks related to the contractual specifications contained herein.

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Technical Clichés

state of the art
advanced technology
applied research
prioritize
bottom line
status quo
relevant
meaningful
significant reduction (increase)
viable alternative
at this point in time
under consideration
under separate cover
under review
vitally important
boilerplate
gold platted
rubber-stamped
not invented here
a search of the literature

Figure 12-3. Technical clichés. Clichés indicate lazy thinking.

Strong, Simple, Colorful:

The effects of the ultraviolet waves are much more violent than are those of the visible and infrared—excessive exposure to ultraviolet can cause a severe burn and damage to the lens of the eye with no warning whatsoever. Electric welding arcs and germicidal lamps are the most common
Avoid vague, unsupported generalizations. Identify subjective statements as such. Use numbers, statistics, and symbols with care, and be as technically precise as necessary for your intended audience.

Is it really necessary to emphasize accuracy and precision to scientists, engineers, data processors, and other technical professionals? A story about IBM should suffice as answer: "When I first came to work for the company, I was asked to sit in on a meeting in which my boss was making a big presentation to his bosses. On about the fifth slide, one of the VPs in the group said, 'Back up. That figure doesn't agree with the one you had on the second slide.' My boss went back to the previous slide and found the discrepancy. The VP's comment was, 'Sit down. Everything you say from now on will be totally invalid for me.' I remember thinking at the time that he was awfully harsh and rude for that kind of mistake. But... I don't know... I see his point now that I'm a manager myself. I get so tired of seeing reports with errors—just carelessness and sloppiness. They really affect credibility."

Similar stories about technical inaccuracies surface frequently. Check your own writing for the following weaknesses, which have no place in technical documents.

Avoid vagueness; quantify when you can. Be precise and diligent in presenting the details and statistics necessary for your intended audience and for your purpose. Vagueness can lead to misunderstanding and may cast doubt on all your research.

Not: Several prior studies...
But: Three prior studies...

Not: A large number of well completions...
But: Almost 1200 well completions...

Not: We spent several weeks investigating whether...
But: We spent 24 days investigating whether...

Not: A majority of our lab samples...
But: Eighty percent of our lab samples...

Beware of unsupported generalizations. When you feel the need to make statements such as the following, beware of the tendency to write your "facts" rather than research them.
As leading experts have noted... (Who? Where?)
Few will doubt... (If that's true, why point it out?)
Few will argue with the fact that... (An attempt to keep me from arguing?)
Most scientists writing at that time... (What survey?)
The vast majority of engineers today... (Agree? You've got to be kidding.)
Several professors at major universities... (Your graduate advisor and who else?)

Identify subjective statements as such. When scientists pile fact upon fact, readers may become lazy; they may accept unsupported, subjective statements along with the rest. Therefore, it's the technical writer's responsibility to warn readers when there could be other plausible interpretations of a finding or other conclusions drawn from test results.

Use direct statements to identify subjective, controversial comments rather than hedge words and phrases:

Although others may differ in their interpretations of these findings, I believe...

Although some may argue that..., I propose...

It is my opinion that...

I think...

In my estimation, the results show...

While there are other feasible alternatives, my work suggests that...

Use numbers, statistics, and symbols with care. If there's one commonality of most technical writing, it's a document chockful of jargon, symbols, abbreviations, and numbers. If the subject is already a complex one, the numbers and symbols add to its complexity. Therefore, handle all numbers, statistics, and symbols with care.

Some of the most insidious misusers of "statistics" are the writers of television commercials. By no means will we call them technical writers, but they do offer several examples of misleading statistics.

A few years ago when smaller imported cars were first gaining popularity, reliability became a key consumer issue. At that time, the following claim appeared on national television: "Nine out of ten Volvos sold in this country during the last ten years are still on the road."

This message left the impression of a phalanx of battered but indomitable Volvos, with an average age of five years, still faithfully serving their owners. What the commercial failed to mention was this: Volvos, and imports in general, were enjoying an unprecedented surge in popularity in America. Therefore, nine out of ten Volvos sold in this country during the previous ten years were probably sold during the previous 12–24 months. All Volvos more than two years old could have been in the junkyard and the "statistic" would still have been correct!

Scientists, engineers, and other technical professionals normally do not purposefully mislead. But carelessness with statistics can confuse readers.

In the testing and procedural sections of a report, of course, you will give numbers that are appropriately precise because readers of these sections will need to know specifics. But when you summarize the major conclusions in an executive overview, be cautious about statistical overkill. Rounded numbers are easier to grasp quickly and to remember ("about 50 percent" rather than "51.1 percent"). Keep these additional guidelines in mind:

- Express decimal numbers using significant digits—and no more.
- Always use the same basis for comparisons.
- Always specify the base in any expression of percentages.
- Introduce acronyms and symbols before using them. (For example: Quality assurance (QA) is...)
- Define all symbols unfamiliar to any of your readers.
- Follow grammatical rules to fit symbols substituting for words into a sentence.
- Center equations on separate lines in the text and keep all fractions and signs on the same level. (Exceptions, of course, include numerators, denominators, and exponents)
- Express units of measurement by using words or standard symbols, not informal abbreviations.
Common weaknesses in correspondence include buried key ideas, unclear expectations about the actions to be taken, and an impersonal, discourteous tone. Most technical correspondence should follow the MADE format: Message, Action, Details, Evidence. (Evidence, if any, consists of optional attachments or enclosures.)

Correspondence doesn't always communicate. A sales manager of a large computer company recently walked into a meeting where the latest communiqué from headquarters was under discussion. “That is the craziest, most absurd, most confusing memo I've ever read in my life.” All the sales reps around the table agreed and expressed variations of that sentiment.

“Headquarters wrote us a memo supposedly to tell us how to calculate discount prices on trade-in equipment, but I gave up about half way through. I never did understand whether we were supposed to accept the equipment and offer the buy-back price ourselves. And understanding the calculations was impossible. What are we supposed to do with the memo anyway? I figure I'll just file it for the contact name and number and, if the subject ever comes up, call to ask somebody up there to translate.”

The manager hit on the two most frequent complaints about internal correspondence: The key ideas are buried and the action to be taken is unclear. In other words, headquarters had just sent their sales department another typical “So what?” memo.

A third frequent complaint about letters and memos from technical professionals is that they are impersonal, abrupt, or even downright rude. In C. S. Forrester’s series about British naval warfare around 1800, Captain Hornblower frequently received overbearing, curt dispatches and orders from the admiralty. We have seen correspondence from technicians to their supervisors or, worse, to customers that would rival those of Lord Cornwallis to his subordinates. Because their information is strictly factual, technical writers often pay too little attention to their tone and may sound overbearing, or even threatening. Remember that courtesy is always a virtue, even in technical writing.

The Ascending Format

Because letters are relatively short documents, technical writers tend to use the once-upon-a-time essay format they learned in English composition class. Their letters often begin with an account of what prompted them to write, continue with supporting details, and finally present the main points and conclusions.
With that arrangement, readers must forge ahead in the dark, unaware of the significance of those tidbits of information floating by. They continue to plow through detail after detail with a "So what's the point?" attitude until they finally get to the "Ah-ha" conclusion at the end of the letter. Then with that conclusion in mind, they have to go back to the beginning of the letter to re-sort and rethink the details that didn't quite make sense on first reading.

In other words, the letter has been written backward. (The remarks above apply to memos as well.)

The Descending Format

So what prevents this backward approach and helps readers understand the message and action on the first reading?

Many technical professionals are relieved to discover a format for writing effective informational letters: the MADE format.

**Message**

What is the message of most interest to your reader?

**Action**

What action do you want your reader to take? Or what follow-up action do you plan to take?

**Details**

Elaborate on the necessary details—who, what, when, where, why, how, how much?

**Evidence**

Mention any attachments or enclosures that will make the message clearer or the action easier to take.

Review the memos in Figures 22-1 and 22-2 to see how much easier it is to understand the message on the first reading when a document is in the MADE format.

Note that a message statement differs from a purpose statement. Many writers have learned from the experience of reading the documents of others that finding the key points up front helps. But the message statement in the MADE format (see Figure 22-2) goes much further than a purpose statement.

A purpose statement contains hints about the general subject and promises to give important information later in the memo or letter. A message statement actually informs; it gives the key information, the meat of your idea (see Section 1.1 for more examples).
Once-Upon-a-Time Correspondence

To:                       
From:                     
Subject: KEW De-oiling Heater Options

Attached are calculations showing the cost of a serious de-oiling heater problem. The pressure drop through the KEW de-oiling heater has caused operations to bypass the heater and go to the soft-wax recovery surge drum to prevent dewaxing filter boots from overflowing. According to my calculations, the old boot pumps can run 6590 BPD at 221 feet of head with new impellers. New impellers from Huffmaster are available on 26-week delivery. These impellers have a capacity of 7100 BPD at 200 feet of head. On certain blocks it would be necessary to run 7200 BPD at 210 feet of head, so new pumps would definitely help overcome the pressure-drop problem.

The control valve is oversized and does not contribute to the pressure-drop problem. The de-oiling heater has plenty of warming area, but the treated water side is fouled and needs cleaning.

There are four permanent solutions to the problem:

1. Replace the de-oiling heater with a larger one.
2. Add another heater in parallel.
3. Replace the boot pumps with a surge drum and two large pumps.
4. Replace the impellers in the boot pumps.

We recommend the surge drum and new pumps mentioned in the Process Duty Specification. We also recommend that the de-oiling heater be carefully designed with a high fluid-flow velocity because melting product wax adversely affects filtering.

As you know, this procedure is costly because part of the bypass material is product wax. We need your decision about either replacing or adding another de-oiling heater. Please call me with any further questions.

Figure 22-1. Once-upon-a-time correspondence. The reader must read to the end of this memo before the details make complete sense and the recommendations become clear.

MADE Format Correspondence

To:                       
From:                     
Subject: KEW De-oiling Heater Options

Due to the pressure drop through the KEW de-oiling heater, product wax is bypassing to the soft-wax recovery surge drum. This problem leads to a loss of approximately $10,000 annually.

To correct this problem, we recommend the purchase and installation of a new surge drum and pumps to replace the existing dewax boot pumps. This change will solve the problem permanently without causing damage to the wax crystal. We also recommend a de-oiling heater with a high fluid-flow velocity be installed because melting product wax reduces filtering efficiency and increases pressure drop.

The total cost of these changes will be $4200. The project can be completed by September 1, with a total downtime of three days or less.

The other three possible solutions are:

- Replace the de-oiling heater with a larger one.
- Add another heater in parallel.
- Replace the impellers in the boot pumps.

The old boot pumps can run only 6590 BPD at 221 feet of head with new impellers. Larger impellers have a delivery wait of over 26 weeks, a delay that will mean the problem cannot be corrected before winter. Furthermore, the maximum capacity of the existing pumps is 7100 BPD at 200 feet of head, and on certain blocks it will be necessary to run 7200 BPD at 210 feet of head. Thus, new pumps will be necessary anyway. Additionally, new pumps will definitely help overcome the pressure-drop problem.

The control valve is oversized and does not contribute to the pressure-drop problem. The de-oiling heater has plenty of warming area, but the treated water side is fouled and needs cleaning. This cleaning will be done during downtime for modifications.

As you know, the present situation is very costly because part of the bypass material is product wax. Attached are calculations detailing the cost of the problem.

Figure 22-2. MADE format correspondence. By having the message and action statements up front, the reader can understand the details on first reading.