Using Commas in Technical Documents

Technical writing professionals try to simplify grammar rules as much as possible, without hurting the language or putting themselves in straight jackets. Typically, they work in teams and frequently move in and out of projects, so that the same document may be worked on by different writers and editors during the space of just a few years. That's why any writing guidelines based on interpretation or personal style or judgment must be avoided.

Comma punctuation is a good example of this effort to use clearly defined rules in technical writing. In journalistic punctuation style, you use commas according to what you think are the needs for clarity. But this is likely to be viewed differently by different people. Therefore, comma usage in technical writing is based on the structure of the sentence.

Use a comma after all introductory elements. Any element, regardless of the length, coming before the main clause should be punctuated with a comma. The main clause is that core part of a sentence that makes it a complete sentence; that is, it expresses a complete thought. Here are some examples:

- When an atom acquires enough energy to leave its orbit, the atom is positively charged.
- As for the energy required to produce plastic automobile parts, the auto makers view the additional cost as justified by the savings in petroleum by a lighter car during its lifetime.
- Because the high-pressure turbo pumps rotate at speeds of 30,000 rpm, the weight distribution on the turbine blades must be balanced with great accuracy.
- Because there is no belt of doldrums in the Atlantic south of the equator, hurricanes do not usually occur there.
- Between 40 and 50 degrees west and just south of 10 degrees north in the western end of the doldrums belt, calms do occur with frequency, and hurricanes originate there with great frequency.
- In 1831, Michael Faraday discovered that if a magnet was moved in the vicinity of a coil, a current could be induced in the coil. (Punctuate even short introductory phrases like this and the next two sentences.)
- Using this concept, Faraday arrived at a relation between the changing flux and the induced electromagnetic field.
- Today, the computer consortium of IBM, Motorola, and Apple is announcing its new PowerPC chip.

Double check commas between the parts of a sentence. A single comma should never break the flow of the main subject, verb, and object or complement of a sentence. Instead, commas should occur in pairs. Here are some examples (the bracketed commas indicated where commas are typically but mistakenly placed):

- The discovery that moving a magnet within a coil could produce current[,] was a major breakthrough in the history of electronics. (Yes, it's a long way from the subject "discovery" to the verb "was" but there should be no comma.)
- Decreasing the radar operating frequency [,] increases the effective velocity coverage for the same sampling rate. (The whole phrase "Decreasing the radar operating frequency" is the subject of the verb "increases.")
- It can be assumed that [,] precipitation particles move with the air in their environment and are therefore good tracers for air motion. (Why would people put a comma here; does it feel like a pause?)
- The separator between black mix and the zinc electrode [,] consists of a paper barrier coated with cereal or methyl cellulose.

Use a comma between all independent clauses. Whenever you have a compound sentence (those are the ones joined by and, but, or, nor, for, whereas), put a comma before the conjunction (the words I just listed in italics). Length of the compound sentence does not matter. Here are some examples (conjunctions are underlined):

- The tank is made of aluminum, but the outer surface is protected by a spray-on foam.
- By the mid-1970s, the free-spending ways of the Apollo Program were gone, and NASA now had to grapple with large technical challenges on a limited budget.
- It first appeared that Hurricane Betsy would reach the eastern U.S., but a looping path took her around the tip of Florida and into the Gulf instead.
- Gamma rays produce few pairs, but they travel farther. (These next three examples are short, but to keep life as simple as possible we punctuate them.)
- You should type your name and then press the Enter key. (In this case "you" is the subject for the compound verb; it's the subject for both "should type" and "press." This is not a compound sentence, and therefore there is no comma before "and.")
Do not use a comma between two compound verb phrase. Watch out about what you think are compound sentences. A complete sentence has to be on both sides of the conjunction (that means subject, verb, object, or complement—the works). Compare the following examples (subjects are italicized, and verbs are underlined):

Offspring exposed to significant amounts of alcohol in utero are much more active than controls and sometimes seem to fly around the room. (This is a compound verb phrase, not a compound sentence: “Offspring” is subject for both verbs.)

Plastic parts are not weldable and must be repaired by other methods.

The observation and measurement of such small frequency shifts require excellent radar frequency-stability characteristics that are not usually found in conventional radar but can be added without a drastic increase in equipment costs.

Pulse Doppler radar effectively samples the back-scattered signal at the radar repetition rate and therefore can provide unambiguous Doppler frequency observations only in the frequency range allowed by the sampling rate.

The manganese dioxide used in batteries is usually obtained from natural ore (mainly from Gabon, Greece, and Mexico) but can be a synthetic product prepared by chemical precipitation or by electrolytic methods.

These last three sentences probably seem incredibly long to you and needy of commas at and and but. Rather than break our rule (and remember it’s not breaking the rule that matters; it’s creating more and more exceptions that will drive us all crazy), why not split these into two sentences each?

The observation and measurement of such small frequency shifts require excellent radar frequency-stability characteristics that are not usually found in conventional radar. However, this same observation and measurement can be added without a drastic increase in equipment costs.

Pulse Doppler radar effectively samples the back-scattered signal at the radar repetition rate. This type of radar therefore can provide unambiguous Doppler frequency observations only in the frequency range allowed by the sampling rate.

The manganese dioxide used in batteries is usually obtained from natural ore (mainly from Gabon, Greece, and Mexico). It can also be a synthetic product prepared by chemical precipitation or by electrolytic methods.

Use commas around all nonrestrictive elements. Nonrestrictive elements are phrases and clauses that a sentence literally does not need to say what it wants to say. These elements can be taken out of the sentence without hurting its basic message. Use commas around these nonrestrictive elements. Here are some examples:

Eighty percent of the work done by the heart is carried out by the left ventricle, which pumps blood into the arteries serving the organs and the tissues. (Nice of the writer to remind us what the left ventricle does, but the sentence could live without it; it would still make sense.)

The test produced a speed in the high-pressure hydrogen turbo pump of 7000 rom, which is 19 percent of design speed. (This is additional detail, not essential to the sense of the sentence.)

The Coriolis force, caused by the rotation of the earth, always acts at right angles to the pressure gradient in the northern hemisphere. (This is a helpful definition but again is not essential to the sentence.)

The bulky equipment, although placed on a rolling cart, must always remain within 6 feet of the heart transplant patient. (Nonessential stuff—put commas around it!)

The formation of hurricane, a type of atmospheric vortex, involves the combined effect of pressure and circular wind. When added to liquids, detergent materials decrease the contact angle, thereby decreasing the wettability. (Nonessential stuff—put commas around it!)

When waterproofing material is added to a fabric, it increases the contact angle, making the fabric molecules may also have some degree of ordered as well as disordered motion, in which case the total energy is the sum of the mechanical and thermal energies. (Nonessential stuff—put commas around it!)

Do not use comma around restrictive elements. Restrictive elements are phrases and clauses that a sentence desperately needs to make sense, to say what it means to say. If you take restrictive elements out of a sentence, you wreck the sentence!
YES You can use the system, when the login prompt appears. (The way this sentence is punctuated implies that you can use the system any old time! The comma indicates that the clause beginning with "when" can be lifted from the sentence.)

NO: You can use the system when the login prompt appears. (The clause beginning with "when" is restrictive--it can't be omitted from the sentence and therefore should not be punctuated. Now the sentence means that you can use the system only when the prompt appears.)

Here are some additional examples of this rather tricky rule:

A turbopump is essentially a pump that is turned by the action of a turbine that shares a common shaft with the pump. (It's not any old pump; it's one that does what the latter part of this sentence says it does. Imagine this sentence ending at "essentially a pump.")

Eighty percent of the work done by the heart is carried out by the left ventricle.

In one study, 11 percent of the offspring whose mothers consumed 2 to 4 drinks per day showed partial features of fetal alcohol syndrome (FAS), while 19 percent of those whose mothers consumed 4 or more drinks per day showed FAS features. (Imagine this sentence without "whose mothers consumed 2 to 4 drinks per day" or without "whose mothers consumed 4 or more drinks per day." The sentence simply wouldn't make any sense. No commas!)

Use a comma before the "and" in a series of three or more. In series of three or more words or phrases, go ahead and put the comma before the and that occurs before the final element. You may have heard that this series-and comma is optional. However, there are situations where the lack of the series-and comma can cause confusion. And when you consider that using the series-and comma cannot hurt the sense of the sentence, it makes sense to use it in all cases.

Instrument panels, bumper components, door liners, seat covers, and grille panels are the most common parts produced directly by auto makers.

A 12-ounce can of beer, a 5-ounce glass of wine, and a mixed drink with 1.5 ounces of 80-proof liquor all contain approximately the same amount of alcohol.

The development years involved designing the components for the Space Shuttle's engines, testing the original designs, and retesting the redesigned components.

In humans, the period of rapid brain development begins at mid-pregnancy, peaks in the third trimester, and ends by the postnatal year.

Do not use a comma between a series of only two. Be careful not to apply the series-and comma rule to a series of only two elements. Watch out also for those situations where it looks like you have a series of three elements but it is actually a series of two noun phrases and a compound verb phrase (if this is meaningless--see the example).

We brought bread and cheese and read poetry. (Sorry for the Dick-and-Jane sentence, but "cheese," and "poetry" are not really in a series. No commas for either "and" here.)

Punctuate series adjectives carefully. It gets tricky knowing how to punctuate when two or more adjectives pile up in front of a noun. One fairly reliable technique is this: if you can switch the order of the adjectives or if you can insert and between them without making the phrase sound weird, then you should use commas. (Remember that in no case is there a comma between the final series adjective and the noun it modifies.)

He's having his third mid-life crisis. Now he wants a new red sports car. (You couldn't say "mid-life third crisis" or "sports red new car," so no commas in or amongst these adjectives.)

Each door is held shut with an adjustable, spring-loaded door latch. (You probably could switch "adjustable" and "spring-loaded"--use a comma here.)

As each rack passes through the wash chamber, the dishes get a thorough soil-stripping wash and a final, automatic hot-water rinse. (You probably could switch "final" and "automatic"--use a comma here.)

These last two examples may have felt a bit "iffy" to you--the technique is only "fairly" reliable.

Note: This doesn't cover all commas rules; see a standard handbook like one of the ones mentioned at the beginning of this appendix for the full set. (Incidentally, you'll notice a lot more flexibility in the rules in those standard reference books--they weren't written for the technical documentation context.)