

Civil Engineering Writing Project - Language Unit 3

EFFECTIVE SENTENCES: SIMPLE SENTENCE STRUCTURES

What do you need to know about effective writing in civil engineering practice?

Experienced engineering practitioners use **simple sentence structure** in most of their writing. Simple sentence structure is effective because it conveys one main idea. Simple sentence structure makes comprehension easier for readers especially when sentences have complex, precise technical information.

Students use fewer simple sentences than practitioners do (Figure 1). In other words, students use complicated sentences more often. Students' sentence structure is more similar to academic journal articles than practitioner documents. In addition, students' complicated sentences often make content ambiguous or inaccurate. Revising sentence structure can therefore be an important step towards effective writing.

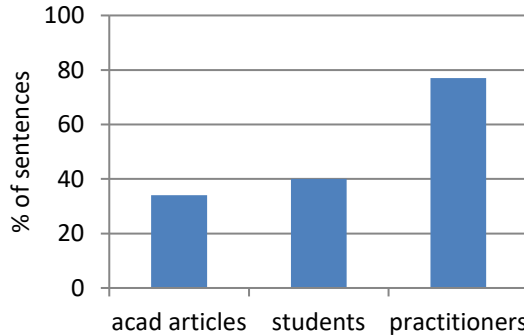


Figure 1. Percentage of sentences with **simple sentence structure** in student reports, practitioner reports, and academic journal articles



What experienced engineering practitioners say

"Clients want to be able to read fast or skim."

"Simpler sentences are more concise. And they are less likely to be ambiguous or be misinterpreted."

What do effective sentences by engineering practitioners look like?

A) Simple sentences have one subject and one verb phrase. They express one main idea. The verb occurs close to its subject. (If you do not understand these terms, use Grammar Lesson #1 – Sentence Punctuation.)

Effective Simple Sentence Structure	
Examples	Explanation
<p>1. The rainfall depth was obtained from the City of Granson, County of Wilson. For the 25-year storm event, 24-hr rainfall depth is 4.0 inches for the site. <i>(Report)</i></p> <p>2. The south leg of the Sawyer Road/Matson Road intersection provides access to a shopping center. The appendix contains the existing turn movement counts. <i>(Report)</i></p>	<p>Each sentence has one main idea. It has a subject (purple) and a verb phrase (red). The verb is close to its subject.</p>

<p>3. The existing embankments and subgrade soils consist of predominately cohesionless sand. Therefore, temporary slopes should be no steeper than 1.5(H):1(V). (Tech Memo)</p>	
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B) Simple sentence structure does not always mean a short sentence. Civil engineering content often requires long phrases for accuracy and precision. Simple sentence structure (one subject, one verb) helps readers understand the long, precise phrases.

Effective Simple Sentence Structure in Longer Sentences	
Examples	Explanation
<p>1. A section of the road embankment has eroded directly beneath and around the ±42-inch culvert near MP 0.75 on Pleasant Drive. (Tech Memo)</p> <p>2. This report presents the results of the traffic operations analysis for the State Route (SR) 88 / Tower Road Interchange Project Study Report in Taylorville, CA. (Report)</p>	<p>Each sentence has one subject and one verb phrase. The verbs are close to their subjects. The sentences are long because of the specific location, size, and names after the verb.</p>

C) When two ideas are closely related, they can be connected in a single sentence that makes the relationship explicit. The sentence is then more complex than a single subject and verb, but even these more complex sentences must be concise, precise and easy to read. Unit 2 Part 2 describes these sentences in detail. Right now notice that these complex sentences are still easy to understand.

Effective Complex Sentence Structures	
Example	Explanation
<p>1. We performed a site reconnaissance on August 12, 2013, to observe surface features. (Tech Memo)</p> <p>2. The slight pressurization of the storm sewer is advantageous because it improves the conveyance efficiency of the system. (Report)</p>	<p>Each complex sentence contains the main sentence plus an additional verb phrase or clause that modifies the main sentence. Closely related ideas, such as a purpose (in example 1) or a reason (in example 2), are connected. The entire sentence is still easy to follow.</p>

MYTH BUSTER

Isn't it more important to worry about "choppy" writing?

Many people remember being told to avoid writing simple sentences because it will make their writing "choppy." If you consistently divide simple ideas that are closely related, your writing may get choppy. For instance, example C-1 would be less effective if it were divided into separate sentences:

We performed a site reconnaissance. It occurred on August 12, 2013. The purpose was to observe surface features.

However, in civil engineering writing, sentences tend to be longer naturally to communicate precise, technical information. Most novice writers have more serious problems from complicated sentence structures than from simple sentences. Compare these bridge descriptions, one written by a student and one by a practitioner:

This bridge has three bays, and while the end bays are approximately 50 feet wide, the middle bay is about 110 feet wide with a height of approximately 20 feet, thereby making this a medium span bridge.

(Student Memo)

The existing bridge is a 9-span timber trestle bridge with a concrete deck. It is 217 feet long and 30 feet wide. The posted speed is 25 mph.

(Practitioner Memo)

The student uses a complicated sentence structure. The practitioner has three sentences that each use simple sentence structure and convey one main idea. Which description is easier to understand and allows smoother, faster reading? The one with simple sentence structures.

For effective writing, work first on conveying one main idea per sentence and let your content determine the sentence length. Maintaining a smooth information flow will also prevent your writing from being choppy (see Language Unit 7).

Techniques for Improving Your Writing

Below are techniques for finding and revising sentences that are too complicated. You will need to exercise judgment as you apply the techniques in your own writing. You cannot just decide you will never write a sentence of more than 15 words or never use a complex sentence structure. Sometimes a complex sentence structure is effective for the content (see Part 2). But all sentences need to express accurate, precise, unambiguous content with a structure that is easy for the audience to understand.

Each technique is followed by a short practice focused on that technique. The More Practice section provides practice with all the techniques in longer passages.

Instructions: Type your answers on another sheet of paper. You can invent details if you need them as you practice effective revisions (but never for real content!).

Technique 1: Check that each sentence has only one main idea. Separate ideas into independent sentences so it is easy to find the subject and verb phrase.

Original Sentence Needing Revision	Revision
An assumption was made to figure out the true stress by trying to figure out where does the cross-sectional area start to decrease, and from there an equation has been made to figure out the true stress.	The stress was calculated from nominal cross-sectional dimensions with the assumption that the cross-sectional area did not change. True stress was calculated by measuring the decrease in the cross-sectional area at the point of failure.

Explanation. The original sentence has too many different ideas. The revision divides the information into different sentences for the different stress calculations – one sentence about calculating stress and one sentence about calculating true stress.



Take time to **rethink your ideas** when you revise sentence structure. Often writers produce complicated sentences because they are not clear about the ideas they want to communicate.

Practice 1: Revise the following passages so sentences each express one main idea.

- a. Foreman meetings take place daily, where they discuss work status, coordinate duties and interpret construction documents, then a site overlook, where main components are looked over to ensure correct construction.
- b. This bridge is not particularly aesthetically appealing. It appears that the designer did not pay attention to how shadows occur on the structure where the vertical girder face without the overhang presents a visual impact to the drivers, also giving the impression that the structure looks deeper that it really is.
- c. One of the many career options for environmental engineering majors is as an Environmental Project Manager, working for environmental regulatory agencies and integrating managerial skills with the knowledge and understanding of environmental issues and regulations as they oversee the development and implementation of solutions to problems affecting air, land, and water.

**Technique 2: Reduce complicated structures to shorter, more precise phrases.
Technique 3: Place lists of items at the end of the sentence.**

Original Sentence Needing Revision	Revision
Although it is easy to describe a material in words, when it comes to real data, variety in materials, variety in test condition, human error and machine error are factors that can spread the data wide enough to make the judgment not as it is easy in theory.	Under field conditions, four factors interfere with consistent measurement: variety in materials, variety in test condition, human error, and machine error....

Explanation. Three changes are important in this revision:

- The long extra clauses starting with *although* and *when* are replaced with a concise, precise phrase: *under field conditions*.
- The complicated final structure (*factors that can...theory*) has been replaced with a more precise

and concise phrase: *interfere with consistent measurement*.

- The list of factors comes after the verb. In English, readers are able to understand sentences faster if the longest part of the sentence comes after the verb. A long list before the verb makes reading difficult.

Practice 2 & 3: Revise these sentences to use more precise, concise phrases and place lists of items at the end. Also apply other techniques, such as more accurate and precise vocabulary to improve the writing.

- For the choice of material used for constructing the bridge, economic and aesthetic considerations, constructability, structural efficiency, and sustainability factors were influential.
- While developing the proposal, legal changes regarding ammonia removal, a review of new alkalinity requirements, and new blower size regulations were considered, as well as reviewing restrictions on tank size.
- The ability to support both residential and commercial traffic, the ability for vehicles to maintain an elevated rate of speed throughout the interchange, the necessity to overcome residential streets, the freeway itself, and the on and off-ramps associated with the freeway are some of the design considerations which needed to be considered prior to the construction of the I-23 – Highway 28 interchange.

Technique 4: Refer to figures, tables, and samples by number.	
Original Sentence Needing Revision	Revision
As shown in the graph below, where all three diagrams have been put in one graph together, it could be recognized that the subject of the first and second test are most likely to be ductile...	As shown in Figure 1, samples 1 and 2 exhibited ductile behavior...
<p>Explanation. The original sentence uses a complicated sentence structure to describe the figure when only the name (Figure 1) is needed. The complicated structure of the main sentence (<i>it could be recognized that the subject...</i>) is revised by numbering the samples (<i>sample 1, sample 2</i>) and using an inanimate subject and active voice. (See Language Unit 3 for more on active/passive voice.)</p> <p>Note: An alternative revision is: Samples 1 and 2 exhibited ductile behavior (Figure 1). Either alternative is better than the original. The choice will depend on information flow (see Language Unit 4 – Part 2).</p>	

Practice 4: Revise so that these sentences refer concisely to figures. Pay attention to the bolded items, but also revise other aspects to make the sentence effective.

- The toughness and temperature data were recorded and tabulated, **as shown on the next page**.
- If we look at the lateral load vs. deflection **graph from the test data, displayed below**, we could see somewhat linear behavior.

- c. **As seen in the final figure attached on the second map**, most of the bridges in the Chesterfield area span intermittent drainages.

More Practice

Apply all the techniques above to revise the following ineffective complicated sentences from student papers. You should also make other improvements, such as using more precise vocabulary. You can invent details if needed for this practice (but never for real content!).

- a. We found there to be two spots on the road that met all of our criteria, which was having a slope of 35 degrees or greater, having a soil type of sediment, as well as being within 130 meters of the highway as illustrated by figure 8. *(Report)*
- b. The bridge crossing Interstate 807 at SW 15th Avenue appears to have been designed to be an effective crossing over I-807 and was intended to serve pedestrians as well as vehicle traffic. This bridge was also designed to not be intimidating to drivers on I-807 because by using piers the vision is not impaired which gives drivers the ability to see through the bridge and prepare for other obstacles. Another aspect of the bridge which must have been considered in designing it was the crossing of not only the interstate but also the on and off ramps which would have been difficult to design around considering the angles that they must be at for smooth traffic flow. *(Site Visit Memo – bridge description)*
- c. On December 1, 2012, our team visited the zoo to see the construction of the new elephant exhibit. [...] An interesting thing about the construction is the fact that the elephants never left the zoo even though usually when there is construction around the zoo they evacuate the animals and just finish the project but in this particular case the elephants were never removed. This makes the construction harder and more time-consuming as the first priority in this construction is not only the safety of all workers but also the safety and well-being of the animals. This is an example of the effect of the environment on work and how engineers have to be able to compensate for that. *(Field Observation Memo)*
- d. Choose a passage from your own writing in engineering that can be improved by revising for simple sentence structure. Show the original and your revision.

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