

## Civil Engineering Writing Project - Language Unit 1

# VOCABULARY FOR ACCURACY AND PRECISION – NONTECHNICAL LANGUAGE

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

Engineering requires accuracy and precision. Your words have to be as accurate and precise as your calculations and analyses are. You cannot use words casually or for general meanings, as you do in conversation. Even for nontechnical descriptions, you need to choose words carefully to convey the meaning you intend.



#### What experienced engineering practitioners say

*“You can’t be a good engineer if you can’t communicate what you did and what it means. Your engineering is only as good as your communication of it.”*

*“Even words that seem similar like calculate, estimate, and determine don’t mean the same thing. If you use the wrong word, you say something you don’t mean - and you can end up causing unintentional liability for the firm.”*

### What do effective word choices by engineering practitioners look like?

A) In effective writing, the words convey precise meaning and every word contributes to the meaning. The meaning is accurate.

Effective Word Choices	
Examples	Explanation
<p>1. The bridge carries <u>two lanes of the highway traffic, one westbound lane and one eastbound lane</u>, over the Gran Passe River. <i>(Report)</i></p> <p>2. The purpose of the project is <u>to improve the safety and capacity</u> of the I-610 at Moraine Highway on-ramp. <i>(Report)</i></p> <p>3. Evergreen forests <u>dominate</u> the higher elevations. <i>(Report)</i></p> <p>4. This report contains information on alternatives that <u>would help reduce</u> roadway flooding on Lone Hill Road in Jackson County. <i>(Report)</i></p> <p>5. It has been a pleasure assisting <u>you</u> in this phase of <u>your</u> project. <i>(Report)</i></p>	<p>Every word is accurate and necessary for conveying the writer’s idea. Each word expresses precise, unambiguous meaning. In particular, note the following:</p> <ul style="list-style-type: none"> <li>• specific numbers (e.g. <b>two lanes, one westbound lane</b> in example 1)</li> <li>• accurate verbs (e.g. <i>improve safety</i> not “make safe,” <i>dominate</i> not “are at,” <i>would help reduce</i> not “will prevent”). If you mean a project will <i>reduce</i> flooding but you write it will <i>prevent</i> flooding, your firm will face serious legal consequences when a flood occurs. (See more in Unit ##.)</li> <li>• complete meaning (e.g. <i>safety and capacity</i> in example 2 – either one alone would not be accurate to describe the project)</li> <li>• <i>you</i> and <i>your</i> in example 5 refers to the reader (the client), not to “people in general” as is common in casual speaking and writing.</li> </ul>

B) Effective writing uses quantities and measurements even in non-technical descriptions. Approximate descriptions or measurements use a low number of significant figures and an adverb such as *approximately* or *roughly*.

Approximate Descriptions	
Examples	Explanation
<p>1. The existing bridge crosses the Robles River and is located on the Copper-Stanville Highway <u>approximately 21 miles east</u> of Copper City. (Tech Memo)</p> <p>2. The Lindsay Avenue (29<sup>th</sup> Street) bridge is located in Cambridge, Oregon. Lindsay Avenue crosses over 29<sup>th</sup> Street in the Powell Historic Inventory Area and is the sole means of access to <u>approximately 40 homes</u>. (Report)</p> <p>3. The bridge crossed the creek at an angle of <u>roughly 90 degrees</u>. (Tech Memo)</p> <p>4. The Prince Avenue intersections at West Ormsby Road, Schwartz Avenue, and Foote Avenue are spaced <u>approximately 1,200 feet apart</u>. (Report)</p>	<p>These sentences provided context in their documents. More exact measurements such as “21.73 miles east of the city boundary” or “39 homes and one garage-apartment” are unnecessary for describing the general context. If more exact measures were included, they could distract the reader with misleading details and create unintentional liability if they proved inaccurate. The writers still use measurements, but they express the lack of precision with <i>approximately</i> and <i>roughly</i>.</p> <p>Other information is precise, for example:</p> <ul style="list-style-type: none"> <li>• <i>the sole means of access</i></li> <li>• names of places</li> </ul>

Unit 1- Part 2 provides information about the more exact measurements typical of technical descriptions.

**MYTH BUSTER**

**Shouldn't words show how smart and sophisticated the writer is?**

Some novice writers choose words because they want to “sound smart.” If you have this urge, resist it. Usually, these writers lower the effectiveness of their writing because they choose words that are made up, inaccurate or imprecise. Consider this description of a visit to an engineering firm:

Jenson-Smithford Engineering is one of the oldest and most proliferous firms in the industry... The fact that the entire presentation took place in the company's meeting room and not on its working floor lent a somewhat advertisemental feel to the visit.

In modern English, *proliferous* refers to plants' methods of reproduction and growth. *Advertisemental* is not a word. Instead of sounding smart, the writing sounds artificial.

Sometimes writers include words they think sound legal or official. Consider this use of *said*:

Countries will begin to deplete their own sources and seek water elsewhere. Other countries will stand to profit from said needs.

Instead of providing an accurate description, the writer never states what the “needs” are. If anything, the use of *said needs* sounds like a parody of legal language. The writer sounds less professional rather than more competent.

When writers try to pick “smart-sounding” words, they usually obscure their ideas and damage their credibility. For effective writing, instead concentrate on expressing accurate content with precise, unambiguous words.

## Techniques for Improving Your Writing

Below are specific techniques to use when revising. They address the most common problems in novice engineers' writing.

Read each technique and then apply it to revise the practice sentences. If necessary, invent details to make the information precise (but only for this practice – never for real content!). You may need to restructure sentences as you revise. Type your answers on another sheet of paper.

Remember, writing requires judgment, just as all engineering does. You will need to think about how you can most effectively apply these techniques in your own writing for particular content, purposes, and audiences.

### Technique 1: Choose specific words that unambiguously convey your intended meaning.

Original Sentence Needing Revision	Revision
A project like this <u>takes</u> <u>great</u> coordination and planning to <u>make sure that the environment and the communities are not negatively impacted</u> .	<u>This project</u> <u>requires</u> <u>detailed</u> coordination and planning to <u>reduce the negative impacts on the environment and communities</u> .
<p><b>Explanation.</b> The original has several ambiguous or imprecise words:</p> <ul style="list-style-type: none"> <li>• <i>A project like this</i> is a vague and casual use of language. Readers wonder “like this” in what way? The writer likely means <i>this project</i>.</li> <li>• The verb <i>takes</i> has many meanings. <i>Required</i> is more specific.</li> <li>• <i>Great</i> could mean a large amount, excellent, or intricate. <i>Detailed</i> is more specific.</li> <li>• <i>Make sure</i> is used for a casual meaning or it is unrealistically absolute. The goal is to reduce the impacts. Reducing the impact is not the same as ensuring no negative impacts.</li> </ul> <p>With precise word choices, the revision makes the content unambiguous.</p>	

**Practice 1:** Revise so that the bolded items convey more accurate, precise, unambiguous meaning. The sentences come from Field Observation Memos describing visits to engineering firms.

- Jenson-Smithford Engineering's office was a **cool looking** office....
- On the tour, one thing **really stuck out** to me.
- Because Tracy isn't an **actual** P.E. he has to interact with **many an actual** P.E. on a regular basis **to help**.  
[P.E. stands for Professional Engineer, someone who is licensed to work as an engineer.]

### Technique 2: Refer to quantities and measurements with an appropriate level of precision.

Original Sentence Needing Revision	Revision
The presenters showed <u>us</u> how to clean up a dirty site, which included <u>a few</u> steps with <u>a lot</u> of procedures. The first one was...	The presenters described how to remediate a contaminated site. They covered <u>five</u> steps, which <u>each included six to eight procedures</u> . The first step was...
<p><b>Explanation.</b> The original is vague and ambiguous. <i>A few</i> and <i>a lot</i> can mean many different numbers. The revision specifies the quantities.</p> <p>To increase accuracy, the revision also applies Technique 1. It replaces <i>showed</i> with <i>described</i>. There was a presentation, not a demonstration. It also replaces <i>clean up</i> with <i>remediate</i> and <i>dirty</i> with <i>contaminated</i>. The original could mean sweep, straighten stacks of materials, or many other ways of cleaning a dirty place. The presenters discussed remediating contaminated sites.</p>	

**Practice 2:** Change the bolded items to quantities or measurements.

The sentences come from first-year students' Field Observation Memos describing visits to firms and construction sites.

- a. Jenson-Smithford Engineering's office **seemed** to be **pretty big**.
- b. The weather was **very warm**.
- c. There are **bridges all over** the Evergreen area, and only **a few of them** are used for public transportation.

<b>Technique 3: Delete unnecessary words.</b>	
Original Sentence Needing Revision	Revision
1. This bridge will make it easier for people who <u>don't necessarily have a car</u> to cross the river.	1. This bridge will make it easier for people who <u>are not driving a vehicle</u> to cross the river.
2. The sidewalks under the overhang meet in <u>a sort of</u> a point above the concrete piers.	2. The sidewalks under the overhang meet in a point above the concrete piers.
3. This railroad bridge is a steel girder bridge (see <u>the attached photo on the next page</u> ).	3. This railroad bridge is a steel girder bridge (see <u>Figure 1</u> ).
<p><b>Explanation.</b> Words are unnecessary if they do not add to the meaning of the sentence. Try deleting a word and see if the idea is clearer.</p> <ul style="list-style-type: none"> <li>• <i>Necessarily</i> adds nothing to the meaning of the example 1. The revision deletes it. The meaning was also made more accurate by using <i>are not driving</i> (rather than <i>have</i>) and <i>vehicle</i> (rather than <i>car</i>). People might own a car, truck, motorcycle, or van but choose not to drive it.</li> <li>• In example 2 <i>sort of</i> is a vague expression often used in conversation. If the sidewalks meet in a point, <i>sort of</i> should be omitted. If it is not a point, a different word is required.</li> <li>• In example 3 it is unnecessary to tell readers where a figure is located and that it is a photo. Instead, the revision refers only to the figure number. A document may have several figures, and their locations may change as drafts are revised. The most concise and accurate way to refer to them is by their number.</li> </ul>	

**Practice 3:** Revise these sentences to delete unnecessary words. Pay special attention to the bolded phrases.

- a. The main potential for structural failure in the building arises from the disintegrating wooden beams that are used to support the window. **A whole view of said window can be seen in the attached picture.** *(Structure Assessment Memo – this is the only structural failure discussed for this building)*
- b. I **really** was impressed by the solar panels on the south facing side of the building. ...[continues with the solar panels]... *(Field Observation Memo)*
- c. The site is three acres **in size.** *(Report – site description section)*

Technique 4: Check the literal meaning of the idea expressed in each sentence, not just individual words.	
Original Sentence Needing Revision	Revision
<p>1. <u>This reality was true for a variety of reasons.</u> [Discussing why measurements by team members varied.]</p> <p>2. The design results in <u>an oppressive feeling driving under the overpass and causes an instinctive slowing as you approach.</u></p>	<p>1. <u>The variation in team members' measurements can be attributed to three factors.</u></p> <p>2. The design results in <u>a dark underpass with a short sight distance that causes approaching traffic to slow.</u></p>
<p><b>Explanation.</b> Although most of the words in these sentences appear meaningful, the ideas expressed by the sentences are not effective.</p> <ul style="list-style-type: none"> <li>• Example 1 is a useless generalization (“reality was true”). The revision conveys specific information.</li> <li>• In example 2 the writer claims to know that drivers feel oppressed, but it is impossible to know others’ feelings just from observing that cars slow. The writer also inaccurately uses <i>you</i> to mean drivers generally. The revision makes the observation precise.</li> </ul>	

**Practice 4:** Revise to make these sentences more meaningful.

- a. After analyzing the geology of the site, the engineers went ahead and prepared a geotechnical investigation. *(Field Observation Memo)*  
[Hint: The engineers didn’t just prepare for an investigation; they did it. This writer is probably confusing “prepare a report” or “prepare an investigation plan” with “conduct an investigation.”]
  
- b. There were some important things about the bridge and the tower, especially how they use natural rock around the tower to get a view of the waterfalls. *(Field Observation Memo)*  
[Hint: “How” implies that the process or manner is important, but the writer is concerned only with the effect. Consider a revision that omits “how.” We also do not know who “they” are.]

### More Practice

Apply any of the techniques above to make the vocabulary in these samples more effective. If necessary, invent details (but only for this practice – never for real content!). You may need to restructure sentences as you revise.

- a. During the tour, the guides walked us from a bridge to the engineering building. While we were walking, they stated some facts and showed us the pedestrian trails. The guides discussed how hard it was to get support to build the trails and how much they went through making the work noise as low as possible in the living areas. *(Field Observation Memo)*

- b. Environmental project managers have to conduct a lot of consultation. Each project involves several individuals. Every playmaker has to work together for the one project to come together perfectly. As a result, the environmental project manager has to consult with engineers, regulators, internal and external scientists, and others to plan the projects. *(Field Observation Memo)*
- c. The bridge was built where an old ship yard used to be, which had a lot of toxic soil. They had to do something with this toxic soil, so they had piled some of it up in a huge trapezoidal shape and cemented over the top so they could use it to build with. The rest of the toxic soil had to be taken somewhere else in the state to be dumped, which cost a lot more money. *(Field Observation Memo)*
- d. Choose a passage from your own writing in engineering and revise it to make the vocabulary more accurate and precise. Show the original and your revision.

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