



## FYI

# Clarity, Accuracy and Punctuality in NDT Reports: The CAP System

by John G. Taylor

The CAP system stands for clarity, accuracy and punctuality. These are the three fundamentals in producing a quality nondestructive testing (NDT) report for the customer. It has to be clear so that even those who are unfamiliar with NDT can comprehend its intent. The results must be accurate and leave the reader without doubt that all procedures and instructions were followed in a proper manner. The report needs to be punctual; the results must reach the end user in a timely manner so decisions can be made.

When used together each one of these fundamental principles will make for an effective report. As a professional, your signature at the bottom of the report will reflect your commitment to producing quality workmanship. The report is your canvas. Sign it proudly.

As business consultant John C. Maxwell observed, “You will never change your life until you change something you do daily. The secret of your success is found in your daily routine” (Maxwell, 2012).

### Clarity

Your writing is a reflection of your thinking. Clear writing will make you a valuable asset to any team.

One of the best ways to improve your writing skill is to read aloud for 10 minutes a day from writers who write clearly and distinctly. Do not focus on content as much as style. Listen for the drastic contrast between the vague and careless styles often used in daily conversations and the carefully crafted words of great writers.

Always use courteous, dignified and appropriate language without being stuffy. Use specific words and avoid clichés like “all set” or “operationally ready.” Avoid redundant phrases like “assembled together,” “final completion” or “total number.” Some words can actually insult the reader. Cut out the gibberish. Avoid words that appear to say something but do not. These are words that require neither effort nor thought.

Journalists are taught not to “bury the lead.” They put the headline first and do not hide it in the story. The same is true for the reports NDT professionals write. Let the customer know the results in the first few sentences. Let the details of the inspection do the talking. If the report delivers results the customer does not want to hear, wording should be calm and clear. Always remember that the reader cannot read your mind; what is obvious to you may require an explanation to the engineer. Always use a logical and detailed approach when developing content. Once the reader becomes confused or misunderstands the information, the reader can become distracted. A clear and concise report prevents that (Roy, 2013).

Present important information using short words and sentences. The report will be clear and memorable. The series of events taking place during the inspection should be in the proper order. This allows the reader’s mind to easily follow the sequence. Use an active voice where the subject does the action. Keep sentences orderly with subject, verb and then object. For example, write “The weld was cracked” instead of “There was a crack in the weld.” Keep the rule consistent within the report.

The report must also reflect the terminology that the customer uses at his or her facility. A tank at plant A might be called simply the spray dry absorber (or SDA) while at plant B it is the sulphur dioxide atomizer. Avoid using acronyms or slang terms for the parts that are being inspected. Identifying the equipment with the proper nomenclature reinforces your commitment to quality reporting. It also enhances your understanding of the process.

Make reports flow smoothly and thoroughly review them when completed. Try running the report through readability statistics like the Flesch Reading Ease test (Flesch, 1948). A readability score between 60 and 80 allows the reader to stay engaged with the topic (Figure 1).

One important question to ask when reviewing the report is what information does the reader want from the report?

Style	Flesch Reading Ease score	Average sentence length in words	Average no. of syll. per 100 words	Type of magazine	Estimated school grade completed	Estimated percent of U.S. adults
Very easy	90 to 100	8 or less	123 or less	Comics	4th grade	93
Easy	80 to 90	11	131	Pulp fiction	5th grade	91
Fairly easy	70 to 80	14	139	Slick fiction	6th grade	88
Standard	60 to 70	17	147	Digests	7th or 8th grade	83
Fairly difficult	50 to 60	21	155	Quality	Some high school	54
Difficult	30 to 50	25	167	Academic	High school or some college	33
Very difficult	0 to 30	29 or more	192 or more	Scientific	College	4.5

(a)

Word Count	
<b>Counts</b>	<b>Selection Document</b>
Words:	566
Characters (no spaces):	2922
Characters (with spaces):	3487
Paragraphs:	3
Sentences:	34
Pages (approximate):	2
<b>Readability</b>	<b>Selection Document</b>
Average sentences per paragraph:	11.33
Average words per sentence:	16.65
Average characters per word:	5.16
Average words per page:	283.00
Flesch Reading Ease:	50.83
Flesch-Kincaid Grade Level:	10.00
Automated readability index:	11.00
<input type="button" value="Done"/>	

(b)

Figure 1. Readability tests: (a) example of a Flesch Reading Ease scoring chart; (b) example of readability statistics.

Certainly the reader wants the results of the test, but be aware of the reader. The format may be dictated by the audience and its specific expertise in the parts that were inspected. A design engineer may want more photos and drawings than text. A maintenance manager may derive better information from a graph, while someone in operations may prefer a statistical forecast.

### Accuracy

A report can only be as good as the work that is being presented. Any discontinuities in the design or in the execution of the inspection that are detailed in the report cannot be corrected or disguised.

Avoid the cumulative effect of errors. The more errors there are in the report the worse it will look and sound to the reader. Each individual error, in your opinion, may not reduce the accuracy by very much. However, these errors may be very evident to the reader. A report peppered with mistakes can cause the reader to stop reading, and he or she may never again read anything with your name or your company's name on it. Poor grammar and sloppy writing contribute to lowering the report's credibility. Conclusions and results will be viewed as weak and inept.

While conducting the inspection, use a reliable system for keeping track of items to include in the report and make reliable and readable notes that help ensure accuracy of the report. Many codes and procedures include checklists, but often the best lists are blended using experience and a consensus from other inspectors.

Part of being accurate is being honest. Avoid using code words or statements such as "It is clear that additional inspections will be required before a complete understanding of this phenomenon occurs." Tell the customer you do not understand. Instead of saying "Typical results from this inspection and the analysis of the effects show," rather than commenting on results, it may be productive to present the reader with a colorful graph or images of the condition.

Avoid using subjective adjectives and stick with highly specific words and phrases. Remember that statements of fact will command the customer's attention.

One problem all writers encounter is the reliance on the computer's spellcheck tool. Is it a fillet weld or a filet weld? Both words are acceptable to your laptop. Is that weld 12 inches or pinches? Try to get a second reader to review the text. A good hint is to start at the end and read backwards. This technique makes any small errors scream for repair. To improve accuracy, revisit the report after a time away from it.



Figure 2. Engineering mind map.

When required, be sure to reference the most current procedures and codes that were used in developing the inspection and the report. If the included checklist is from the fourth edition but the fifth edition was published six months ago, your reader may question its accuracy. Besides reviewing current procedures, read old reports. The old report may reinforce the finding of your inspection. But it can also contradict the results. If this occurs, a detailed explanation should be included to defend your analysis and your accuracy.

To improve future reports follow up with the customer to see how effective it was in achieving the objectives and adjust future reports for that company accordingly.

## Punctuality

Punctuality simply measures how well you are able to manage your time. If your time is not valuable to you then other people's time will also not be valuable to you. Late reports disturb the experience of other people and put a strain on your relationship with a customer. It can hurt your career and will add more stress to your life. It is usually caused by misperceiving the passage of time or underestimating how long a project will take.

The first step in having on time reports is to begin planning your time. Start at the end and work backwards. If you have three days to complete a written report make your timeline with specific goals that need to be achieved daily. The main focus to on time reports is to work on your own powers of concentration.

Be proactive and manage your time to fulfill your promise to deliver an outstanding report. Give your work the highest priority and learn to say no to other projects, explaining that your report is critical and constrained by a deadline. An honest discussion with your manager or the customer reinforces your professionalism and commitment to the task.

There are a number of ways to improve your time management. First, see what time of day works best for you. Then, schedule as large a block of time as necessary to complete the detailed task. Keep a picture of the project at hand and develop the report around that. Try to finish the report before you start to edit it. Take breaks and quit when you get tired. But quit in the middle of a sentence so that by the next day you can get started without hesitation. Write on a sticky note that you will be completed by a given time and then post that note conspicuously where you and everyone else can see it.

One effective technique for organizing a report is called mind mapping (Figure 2). This is simply a group of words with circles drawn around them. Lines connect groups to one another. Write the main point of the report in the middle of the page and then let the ideas for building the document grow from there. You can use pictures, symbols, words, color and images to take a list of monotonous information and make it into an organized and memorable report. Strive to make the report flow with the brain's natural way of processing information (Buzan, 1996).

Have a fresh document preformatted with the font, margins, spacing, footers and headers necessary. Develop a typical report layout that can add or delete sections depending on how comprehensive a report is required. The laptop and tablet are great tools for creating faster reports. This technology allows for rapid information transfers and online results.

## Ten Simple Rules to Create Great Reports

1. Keep the report short while including all essential information.
2. Remember to value your reader's time.
3. Keep it organized for the convenience of the reader.
4. Avoid clichés, jargon and redundant phrases.
5. Use a great summary that gives a picture in miniature.
6. Check and check again for spelling, grammar, layout and accuracy.
7. Write to improve the reader's understanding of the content.
8. Keep all references current.
9. Provide results that can stimulate action.
10. Improve your reports with customer feedback.

Why would anyone want to improve his or her report writing skills? Because your managers and customers will recognize that you possess strong analytical skills. It shows a passion for your work, how you present facts, and the results you produce. This skill is what employers are looking for in their company.

Ask yourself what types of inspections and what types of equipment will you be inspecting in the next 20 or 30 years? One can only guess what will be cutting edge and what will be obsolete. The only thing that is certain is that results will need to be presented in a clear, accurate and punctual report. ●

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