

Good Style

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This chapter will include much detailed advice about style, but other important aspects are to be found in later chapters. The main points to remember have therefore been brought together as a checklist to help you to achieve and maintain an appropriate, readable style. The rest of the chapter will look at these important messages more fully, with examples and activities.

Checklist for good style in technical writing

- Use simple words as far as the complexity of the material allows.
- Avoid irritating jargon; make every word add to the meaning or the ease of reading.
- Keep the language formal: don't use *don't*, or slang.
- Write concisely and avoid waffle; never discuss your own feelings.
- Vary the length of sentences, making sure that none is longer than about 40 words.
- Use short sentences to highlight important information.

- Balance the need for a unified structure to your paragraphs with encouragement for the reader.
- Use lists whenever possible, numbering the items if the order is important.
- Be precise, using words and figures to show accuracy of information.
- Use a level of technical language that is appropriate to your readers.
- Include linking words and phrases such as *therefore* and *at the same time*.
- Decide the right way to convey each piece of information, whether by words, diagrams or mathematical material.
- Use this checklist whenever you write!

Definition of good style

Good style can roughly be defined as style which is appropriate to the needs of the reader. A particular piece of information might, for example, be presented as original research in the publication following an academic conference. Subsequently, it might appear in a textbook for undergraduates; it might become such a basic contribution to knowledge of the subject that it would appear in a newspaper article for the intelligent but non-specialist reader; it might be published in school textbooks; eventually, it might be found in a children's encyclopaedia. In each manifestation, the information will be presented with vocabulary, sentence structure, explanation and examples suited to the current readership. If the level is estimated incorrectly, the information will not be accepted. It will be seen as 'too difficult', 'bewildering' or 'condescending', and will be rejected by the reader for whom it was intended.

Such extreme variations of readership are unusual, but they illustrate the need to write in a style which is helpful and encouraging to readers. Writing in a vacuum, for the sake of writing rather than for a clearly defined audience, is unlikely to result in good style, and, indeed, the end product will probably not be read at all. The first requirement of good writing is that it suits the reader.

Good style is appropriate to the needs of the reader.

Later in this book, we will consider choice of words and the organisation of sentences and paragraphs. In doing so, considerations of style will be important. Sentence length, for example, can help or hinder reading: very long sentences are often difficult to read. They may have their place in works of literature, but not in the immediate transmission of engineering information. However, good style is more than the correct choice of words or appropriate length of sentences. It also involves a wise choice of material and the appropriate putting together of discrete pieces of information. Both aspects will be considered in this chapter.

Readership and objectives

Long before the first word of a technical paper or report is written, the prospective writer needs to ask and answer a series of questions:

- Who is my reader/are my readers?
- How much does the reader know about this subject?
- What is the reader's experience of this type of work?

The reader or readers must first be identified so that the writer can choose the style correctly. How technical should the vocabulary be? How many terms will need explanation and how much can the writer take for granted? What kind of examples will be helpful?

It will not always be possible to find exact answers to these questions.

The initial readers might pass on the document to other people about whom the writer knows nothing; a report, for instance, might be read again years after its first distribution because a similar problem has arisen. Nevertheless, the writer needs to attempt to find answers and to assess how far such questions can be answered under current circumstances.

Next, the writer moves on to objectives, both his or her own, in writing the document, and the reader's, in sparing the time to read it. Again, there is a useful series of questions:

- Why should a busy writer find it necessary to commit this information to a written form?
- Why should the reader, busily involved with other work, bother to read this document?
- What does the writer want to happen as a result of writing this document?
- What does the reader want to happen as a result of reading this document?

One clear result of asking these questions is that the writer will recognise the need for brevity. Both writer and reader are busy engineers with other preoccupations than the paper in question, and they will be helped if it is as short as possible. Part of the courtesy of good style is to avoid wasting the reader's time with what is unnecessary or irrelevant.

These final questions, about objectives, need more careful analysis. What does the writer hope to achieve? The answer may seem obvious: she wants her new young assistant to be able to carry out instructions competently and in safety; he wants the answer to his letter to be an order for his company's product; they (much technical writing is the output of a group rather than an individual) want their report to result in the company installing the most appropriate system. There are, however, other hidden motives: to persuade the client to think well of the company, encourage superiors to think well of the writer, or further a promising career.

If the writer is to be successful in such objectives, the information must not only be presented briefly. It must also be accurate and clear to the reader. Chapter 6 will look at accuracy of presentation, but good style involves choosing words and examples which convey precisely what the writer means, and which will be understood by the reader in the same way. Ambiguity or careless use of words will blur the issue and may produce the wrong result. Good writing demands precision of thought and precision of language.

Good style has its ABC: accuracy, brevity, clarity.

The 'courtesy' of good style was mentioned above. Courtesy involves consideration for the reader, which may for instance dictate the way in which he or she is addressed. 'He or she' is used advisedly; some engineering documents still assume that the readership is male. In a long document, the writer may feel that a decision has to be made. 'He or she' used repeatedly is cumbersome and long-winded; the decision made in writing this book was to avoid prejudiced language, often by the use of the plural, and keep the use of 'he or she' to a minimum.

Formality

Courtesy will also be a factor in decisions about formality. On the whole, emails may be informal, letters are more formal (perhaps their rarity nowadays encourages the formality), and reports and technical papers are very formal, although there are exceptions in each case. Instructions are impersonal (not 'You must switch off the engine' but 'Switch off the engine'). Formal writing does not allow the use of abbreviations such as 'it's' or 'can't', or the inclusion of slang or casual expressions better suited to spoken language. In the most formal writing, the reader is not addressed directly ('You will find that' becomes 'It will be found that'), and

Activity 3.1 Levels of formality

In the following passage, the writing style varies between the informal, the formal and the pompous. Rewrite the passage, making it consistent in a formal style which would be appropriate in a technical document.

The members of the team have done three experiments so far, but at the end of the day they may not get the results they expect. If the results are inconclusive, they may have to start again from scratch and repeat all the work. It's a pity they didn't bother to take advice from more experienced engineers right back at the inception of the project. Documentation was indisputably available which would have shown the necessity of further preliminary investigation. Could this waste of time have been prevented? It seems probable, if the aforementioned proposal for an initial feasibility study had been implemented at the beginning.

abbreviations such as 'e.g.' or 'i.e.' should be written out in full, especially in passages of continuous prose.

Sometimes company policy dictates the level of formality, but if an individual engineer has to make the decision, it will be based on a consideration of the company's relationship to the reader and also on the information itself. If a full report format is chosen, the style must be formal, although a very short report for the use of colleagues might be written in a slightly less formal style. Once the appropriate style is chosen, it must be used consistently; any deviation to a more formal or less formal style will distract the reader and interrupt the flow of the passage.

Active and passive; personal and impersonal

Two aspects of technical writing are interrelated: writing may be in the active or the passive form, and this will be one of the factors that make the effect more or less personal.

An active style moves directly from subject to verb to object, as in 'Simon hit the ball', Simon being the subject (he did the hitting) and the ball being the object (what was hit). In this form of the sentence, the emphasis is on Simon, as his name comes first. If we reverse this, as in 'The ball was hit by Simon' (passive form), emphasis goes on the word 'ball', and Simon is almost an afterthought. If the most important information is that the ball was hit rather than missed, Simon could even be left out: 'The ball was hit' is a passive and impersonal sentence.

In company terms, an engineer might write

I recommend this policy.

which is clearly an active and personal sentence.

However, the use of 'I' is likely to be too informal for company style, or the writer may want to stress that he or she is writing as part of the company, in which case a more suitable form might be:

We recommend this policy.

This is still an active sentence, but the use of 'we' has distanced it from the individual writer. Courtesy or company policy may dictate that the passive is used. The object (policy, in the example given) now becomes the subject, and the person carrying out the action is not mentioned, unless in the cumbersome and unlikely form 'by me'. The sentence will now read:

This policy is recommended.

The personal 'I' or 'we' has disappeared, and the sentence is both passive and impersonal, which may be what the company wants.

Traditionally, formal scientific and technical writing has used the passive, and this is still generally the convention, though not always followed, in reports; in emails or letters it has tended to lose favour as part of a general move towards greater informality, although company policy may still dictate a formal style. The passive form is inclined to be long-winded, as in the following example:

It is recommended that the new staffing levels be applied by each department as soon as possible.

This sentence contains 17 words, while the active form:

We recommend that each department applies the new staffing levels as soon as possible.

contains only 14. The passive also tends to detract from individual responsibility:

I recommend ...

is a personal opinion, while

We recommend ...

is agreed by the company, but

It is recommended ...

remains unattributable.

In the case of a specification, there is a strong argument for using the active form. The allocation of responsibilities is often part of the job of a specifier, and the name or position of the person who has to take a specified action is likely to come at the start of a sentence if the active is used, and at the end of the sentence in the passive. The first few words of any sentence carry more emphasis than those that follow, and in this way stress is put on the important words that identify the responsible person.

There is one byproduct of the passive which is worth noting. In changing from an active statement to a passive statement, it is easy to give universal significance to what was intended in a more limited way:

I believe that ...

introduces my own opinion, while

It is believed that ...

suggests that many other people agree with my belief. Indeed, when

I cannot accept the idea that ...

Activity 3.2 Active and passive

The following passage is written in the passive. Rewrite it in the active form, and then compare the two versions. How have the meaning and emphasis been changed by the use of the active?

The correct running and maintenance of the machine was Jim's responsibility. When it failed to function correctly, there was an investigation by the manager, who found that regular maintenance had not been carried out, but that the records had been completed as if all the requirements had been met. The machine was seen to be functioning at well below capacity, and, as the guard had not been positioned correctly, there was a risk to the operative. Jim was reported by a colleague to have been ill at the time.

becomes

The idea is unacceptable ...

the world is clearly on our side.

Modern style, then, tends to prefer the active to the passive, but there can be no absolute rule, good style being essentially style which is appropriate to the occasion and the reader, and, of course, company policy.

Use the passive generally in reports, but the active when the identity of the responsible person has to be stressed.

Signs, symbols and abbreviations

Courtesy to the reader also demands that help be given over those aspects of the document which might cause confusion. Signs, symbols and abbreviations are all potentially ambiguous, and the writer should again ask a series of questions:

- Will I use technical (or other) signs, symbols and abbreviations in my document?
- Can I reasonably expect that the reader will interpret them correctly?
- Is there guidance which I should give, for instance should I quote an appropriate British Standard?
- Would a glossary be helpful to my readers?
- Am I consistent in my use of abbreviations, following common usage, for instance in capital or lower case letters?

Guidance is available to the writer but readers also often need help. As far as abbreviations are concerned, there is a traditional form of explanation. The first time the abbreviation is used, the term is given in full followed by the abbreviation in brackets. Thereafter, the abbreviation can stand alone, or, if it seems helpful, be

repeated in full occasionally, for instance at the beginning of each chapter. This is appropriate for a book or a technical article, but is less useful in a report, which may not be read in order, beginning to end; indeed, some readers may need only specific sections. A glossary listing all such expressions in alphabetical order allows the reader to check a meaning from any point in the text. However, if the term is used only once or twice in a lengthy document, it is often easier to write it in full each time rather than make the reader look for an explanation. Glossaries have another advantage: if the reader is familiar with the abbreviation, he or she can ignore the glossary, while other readers can if necessary remind themselves several times of the meaning. Needless to say, the glossary must always be listed on the contents page.

Mathematical material

Measurements and numbering also follow conventions, and it is wise for an engineer to follow British Standards or SI units, or guidance provided by one of the engineering institutions whenever possible. There are sometimes areas of possible confusion caused by common usage, such as *m*, which is the abbreviation for *metre* or *metres*, but not, as it is widely used, for miles.

Arabic numerals should always be used in preference to roman numerals, which can be confused and which in any case are not so easily recognised or understood nowadays. Numbers should also be given in three-digit groups (674 320, with a space rather than the traditional comma to separate thousands from hundreds – unless money is involved!), and a full stop is the most easily recognisable form of decimal point. Current rules with SI units suggest no space between degrees and temperature scale, for example 30°C, but a space between figures and abbreviations for units of measurement, for example 30 mm.

Small numbers, up to ten, are usually written as words, while larger numbers are given as figures. This convention should be applied with care, as there are various exceptions. Round numbers are always given in words ('about a million miles'). If many large and small numbers are quoted in the same text, it may look better to use figures in every case, including the occasional small number. No sentence should ever begin with a figure: write the number as a word, or, if necessary, change the word order in the sentence. Decisions about the presentation of numbers are best made in the light of the context, with the convenience of the reader uppermost in the mind of the writer.

Follow national, international or professional conventions in presenting signs, symbols, units of measurement and abbreviations.

Many forms of writing by engineers include data sets, diagrams representing the data sets and equations; it may also be necessary to describe the mathematical model in use.

Data sets

Most commonly, data sets are in the form of a long list or table of values. In deciding how to present this information, it is essential to assess how it is to be used, both by the reader and by the writer later in the document. Data sets for a series of experiments, for example, may be kept separate or combined; if the writer wants to discuss separate runs of an experiment in the main body of the text, it is essential to present the data for each run separately. As with any diagram, every table of data needs a number and title to identify it and for easy reference.

Sometimes it will be necessary to include both the raw data itself and the charts and diagrams that come from it. As with all technical writing, the convenience of the reader is paramount, and it may be wise, for instance, to introduce the diagram, explaining its purpose, and then present it in the main text, relegating the list of data to an appendix for those readers who need to study it in detail.

Developing a model and presenting equations

Information gleaned from raw data is used to create a mathematical description, such as a set of equations; this is usually referred to as a *model* of the situation(s) under consideration. In describing such a model, the factors that are taken into account must be set out unambiguously, and, in writing the equations, it must be clear what each variable represents. Both these criteria may be fulfilled together, as in the following example:

On the basis of last year's information, we believe that if the price of Toaster A is £*x*, the profit *p* we will make by selling *n* toasters is given by the formula $p = n \times x \times 0.67$.

Note that this model assumes that profit is only a function of price and the number of units sold. Factors such as availability or price of our competitors' products are not taken into account.

In this example, the variables are defined in the text and there is a clear statement of the limitations of the model. Incidentally, it is also clear what the purpose of the model is: to find the profit to be made in selling toasters!

Using equation editors

Many word-processing packages include an equation editor that allows the presentation of mathematical material. Each has its own peculiarities, and often trial and error is the best way to become familiar with what is available. Perhaps

the most important limitation is that while a package to format equations may allow the writer to produce an equation that looks perfect, the computer may treat it as a separate object inserted within the document. This can lead to page set-up problems, such as lines becoming broken in inappropriate places, although interaction between text and equations is much better than it used to be. Microsoft's Equation Editor, which can be downloaded free, is helpful, although LaTeX is now most commonly used when the text includes mathematical information. Controlling alignment across several lines of mathematical derivation and dealing with page splits are easier in LaTeX than in Word. Both inline equations, which are part of the running text, and display equations, which are presented on a line by themselves and numbered, should be punctuated as though they are a normal part of a sentence, that is, equations that finish a sentence should be followed by a full stop and equations that finish a clause should be followed by a comma. This is harder with Word, which may, for instance, capitalise the first word after an equation, because it assumes a new sentence. LaTeX is very flexible, and is good for embedding calculations, diagrams and so on appropriately within the text. You may still like to be reassured by making a final check on a hard copy that equations are displayed accurately.

Overall, the Microsoft Word editor is easier to use for anyone inexperienced at using an equation editor, but LaTeX will give a more polished outcome, and help is available free over the internet.

In any mathematical context, words such as 'then' and 'therefore' should be used with care. 'Then' can be useful to separate condition from consequence in the context of mathematical notation. 'Therefore' will be used to show a logical connection whatever its context, but a long string of 'therefores' in a mathematical argument is poor style, just as a sequence of 'thens' is clumsy in describing a chain of events (see p. 50).

All tables, charts and diagrams must have numbers and titles for easy reference.

When using an equation editor, check accuracy, if necessary from a hard copy.

Make the purpose of each equation clear and explain what each variable represents.

Use of examples

Sometimes the impact of the text is enhanced by the use of an example or a simple analogy which aids the understanding of a difficult idea. There are two rules for using examples: they must be at the correct level for the readership, and they must be widely understood. The writer should not over-explain, giving examples when the point is already sufficiently clear. At the same time, an analogy

which is woven into the text, as in the following example from the essay of a student engineer, can be helpful to the reader's understanding and also enliven the text, adding a light-hearted touch to a serious subject:

The problem of progressive collapse can be likened to the toppling of dominoes. As one domino becomes unstable and falls, the impulse that it implants on its neighbour will cause further destabilisation. This will continue until the entire line of dominoes has collapsed. The conditions required for the propagation of this wave of destabilisation have been evaluated [reference needed]. Obviously, if the separation, l , of the dominoes is greater than the height, L , the destabilisation of one domino cannot have an effect on the next. Less obvious is the fact that if the dominoes are closely spaced, the wave of collapse will run only for a limited distance before stopping. The spread of the collapse wave is fuelled by the release of potential energy stored in the upright dominoes. If this energy were not available, the process would be arrested by friction. In structures, failures may progress catastrophically, as in the case of Ronan Point, where a single failure spread, domino fashion, throughout the structure.

In this passage, the writer has extended his example beyond the obvious, and has then developed his principal discussion, of progressive collapse in buildings, on the basis, previously established, of the collapse of dominoes. There is one potential problem. Pleasant though the example is, it will work only if the reader is familiar with dominoes. A writer must always be alert to the danger of examples which seem clear in one cultural context, but which are not helpful to the rest of the world.

A well-chosen example helps the reader's understanding and gives life to the text.

References

A common form of textual reference to books or articles quoted is the author's name and the date of publication, in brackets (this is known as the Harvard system). An alternative, but used rarely nowadays, is a small superscript number for each reference; more frequently, the reference number is used in square brackets. Either style is acceptable, although the superscript number is easily confused with, for instance, such numbers in equations. Whichever form of textual mark is chosen, full bibliographical details must always be provided at the end of the document.

The exact style for presenting such information varies, and, if there is no standard format in your organisation, it is wise to consult the major journals in the

writer's own discipline and follow the style which they use. A published style guide is invaluable: the latest edition of the MHRA (Modern Humanities Research Association) Style Guide is highly recommended; in spite of the word 'Humanities', it is widely used by the technical community. It is available online and can be downloaded free. Needless to say, the essential qualities of all references are that they should be accurate and consistent.

References should show full and accurate bibliographical details and should be consistent in form.

Nowadays, there is an extra type of reference, for material from the internet. Online articles and ebooks should have the same information as their printed equivalents as far as possible. It is wise to record as much information as is available, including not only the writer (if known) and the title, but also the DOI or URL. For the latter, the date on which the material was accessed, for example [accessed 1 February 2017], is important; for a DOI, this is less important, as it is an unchanging reference. For online technical material, the DOI is more commonly used. The reference itself is usually given between < and >, and should be checked for accuracy of format, remembering that letters will be case-sensitive. In addition to the reference, it can be useful, if it seems appropriate, to include a screenshot of the page referred to as an appendix.

Giving the source of information which is not the writer's own is, of course, an essential part of the courtesy of good writing. Plagiarism – copying someone else's work without attributing it to its original author – is both immoral and illegal, and rightly so: academics especially base their careers, and certainly their promotion, on their research and the intellectual property that results from it, and to use such work without giving its source is a form of theft. A reference shows the origin of the material in a conventional way, and indicates the honesty of the writer. It is always worth making a record of any material that is to be quoted, or research which is to be mentioned, at the time it is found, as it may otherwise be difficult afterwards to remember where it came from.

Sometimes, the quotation is not word for word, but the ideas are paraphrased. Changing just a few words of the original is still plagiarising. If more than about 10 per cent of the original words is reused, the result is plagiarism, that is, theft; to paraphrase, the new writer must rethink the main idea of the passage and then rewrite it in different words – still being careful to include a reference to the original source. There are, of course, specialised words and phrases which cannot be changed as there is no other way of expressing the precise technical meaning; these have to be kept, but the reference to the original text will make clear that no theft is intended.

A readable style

Engineers who follow all the rules and guidelines for good writing sometimes continue to feel that their documents do not flow well. Good style includes a felicity in choice of words and a sense of the rhythm of a passage which come naturally to some writers of all disciplines but which are not easily achieved by others. Nevertheless, it is important to be aware of some of the ways in which writing style can be improved, even if a high standard of literature is beyond the reach of the writer. Reading one's own writing out loud and listening critically is an excellent way to improve style, as awkward repetition, poor sentence structure or abrupt paragraph endings often become obvious as we hear them. For instance, the sentence before last originally ended with 'beyond the writer's reach', but the repeated 'r' sound is ugly, and a simple change to 'beyond the reach of the writer' immediately improved the style. Two more real-life examples from the writing of engineers show how improvements in style can be made.

The problem was exacerbated by the existence of unclear perceptions by those engineers involved in the project of who the client really was.

If this sentence is read aloud, the awkwardness of the repeated 'by ... of' construction is apparent. There is a secondary repetition of sounds in 'exacerbated' and 'existence', but a much more serious problem results from the use of two heavy abstract words, 'existence' and 'perceptions'. The sentence also ends in a weak style, with a run of short words following the long and complicated words – there is almost a sense of anticlimax – and the meaningless word 'really'.

The first problem to tackle is that of the two abstract words. 'Existence' simply means that something *is*, and 'perceptions' means what they (the engineers) *saw* or *understood*, or, in this case, failed to understand. Once this part of the sentence is simplified (and the long word 'exacerbated' replaced by the simpler 'made worse'), the repetitions will disappear. Out of the mass of words, a simple statement appears:

The engineers involved in the project were unsure of the client's identity. This made the problem worse.

Avoid abstract words as far as possible. Simple, direct language is almost always easier for the reader.

The second example is even more complicated:

We would recommend that the complete landlord's sub-mains cabling system is tested with insulation resistance tests results noted for each cable in a schedule with a basic schematic drawing.

If this sentence is read aloud, the problems quickly become clear. Where should the pause come? We might choose to put a comma after 'tested', but there is still the difficulty of 'insulation resistance tests results' – a nasty collection of nouns which fail to form a clear pattern of meaning. 'Test results' seems more natural than 'tests results' even if more than one test is carried out, and the sentence can then be divided into two separate stages: the tests were recommended, and the results should be noted. This suggests two sentences. Other minor improvements can be made, such as 'We recommend' rather than 'We would recommend', which always sounds hesitant and uncertain, and the word 'complete' should presumably refer to the system rather than the landlord! The passage will then read as follows:

We recommend that the landlord's complete sub-mains cabling system is tested. The results of insulation resistance tests should be noted in a schedule, together with a basic schematic drawing.

This is certainly easier to read and understand.

Listen critically to your own work.

Structure and emphasis

Good writing, then, avoids abstraction and is direct and uncomplicated. Since the written word lacks the stress given by the human voice, it has to be clear, logical and precise. It also demands variety. We have probably all read boring passages in which sentences begin 'First, we ...' 'Next, we ...' 'Then ...' 'Then ...' and so on. More than two sentences which begin with the same words sound monotonous, as do sentences which have very weak beginnings, such as 'Another example is when ...', or 'There are two examples of this and these are ...'. A little thought on the part of the writer will usually produce a more interesting and encouraging version of the sentence.

Technical writing can easily become back to front, with the main point following subordinate information so that the reader has to wait to find out what the subject is. An extreme example of this tendency follows:

Bolted to the stub shaft is the drive gear for the camshaft and bolted to this drive gear is the engine flywheel.

If each part of this sentence is turned round, it will be easier to read:

The engine flywheel and the drive gear for the camshaft are bolted together, with the drive gear also bolted to the stub axle.

Generally speaking, it is best to start with the main point of a sentence, not least as it will then get most emphasis; the difference can be seen in the following two sentences:

It will be the end of the week before the process is complete.
The process will be complete at the end of the week.

Sometimes a clue about the correct ordering of information is given by a key word such as 'urgent', 'essential' or 'dangerous'. Such words should always come near the start of the sentence or their impact is diminished, as in this real-life example:

Due to the lack of resources, corners could and would be cut and this would result in dangerous practices being carried out.

There are two clues to the weakness of this: 'due to' at the beginning of a sentence nearly always means that the information is not well structured, and the word 'dangerous' is too strong to be hidden two-thirds of the way through the sentence. A short, well-ordered version makes more impact:

Dangerous practices could result from the lack of resources.

Some words are better avoided. In technical writing, the most common is probably 'done', as in 'the experiment was done', closely followed by 'split' when 'divided' is more appropriate (obviously, if you split the atom, that is the word you will use). A real-life example of both was found in an engineering report:

The split of the system was done in two parts.

which probably means no more than:

The system was divided in two.

or, possibly,

The division of the system was carried out in two stages.

If technical writing is formal, as in a report, there is no place for personal comments. Occasionally, the writer feels so strongly about something that it seems impossible to leave it out, however inappropriate it is for the reader. 'I found these two interfaces both interesting and challenging to create,' a student engineer wrote, or, in an example found in company documentation, 'The process was held up because the company sent me on a course.' There may be a case for talking to the manager about these points, but they certainly should not be included in a report. The writing should be impersonal, without any comment that shows the emotional state of the writer rather than the technical information required.

The purpose of a report should be kept in mind at every stage of its production. While, generally speaking, the use of 'we', 'us' and 'our' should be avoided, and 'I', 'me' and 'my' rarely used, there may be occasions when they are justified. If, for example, you were preparing a report for your line manager on your secondment to a department of your organisation as part of your induction, it would be very awkward, and disturbing to the reader, for you to refer to yourself as 'the writer' in order to avoid any direct reference to yourself throughout the report. If the whole point of a report is the experience of an individual, then the convenience of writer and reader will overcome any rules about the essential formality of reports.

'Link' words and phrases

Readers need encouragement, especially that which comes from seeing how a passage is constructed. 'Link' words and phrases, which show a logical connection between sentences or paragraphs, guide the reader through the document, and incidentally help the flow of the writing. 'At the same time', 'on the other hand', 'meanwhile', 'bearing this in mind', and, correctly used, 'however', introduce the next stage of the argument. Some links add emphasis as well as flow; the earlier sentence about the engineers and the clients would read better with the addition of the small word 'even':

Even the engineers involved in the project were unsure of the client's identity.

'Link' words and phrases guide the reader through the document and improve the flow of the writing.

Activity 3.3 Linking words and phrases

This activity uses, with permission, a real-life example. A further passage from the engineering student's work on progressive failure (see p. 47) has been rewritten with the logical connecting links omitted. It is awkward to read, and the information is not easy to assimilate. Try to add words and phrases that will improve this material. The original version is given at the end of the book, and a comparison will show how much easier and more pleasant this is to read.

Structures which are highly optimised and operate at a high proportion of their ultimate load are most at risk from progressive failure. Obvious examples of this kind of structure are aerospace structures. Much attention has been paid in the design of airframes to ensuring fail-safety. Airframes have to have as low a weight as possible and are optimised to ensure that no part is larger than necessary. A variation from the assumed load pattern could have a serious effect on members close to the site of damage. Local damage would have this effect. Allowance must be made for this eventuality. Fail-safe or damage-tolerant design will remain serviceable after having been damaged. Alternative load paths are incorporated into the structure by means of multiple redundancy. When damage occurs, there are a number of other members which can carry the extra load.

Writing persuasively

Linking words and phrases serve a further purpose. Not only do they make a passage more readable, but they also give emphasis, drawing the reader's attention to the most important aspects of the information. Combined with the guideline discussed earlier, putting the main point first in a sentence, they enable a writer to make a strong case while at the same time considering all the evidence. Activity 3.4 allows readers to see for themselves how this can come about.

Activity 3.4 Persuasive writing

Six pieces of information about shiftwork follow. Using this information, write a paragraph, assuming, first, that you are greatly in favour of shiftwork and want to convince your colleagues how worthwhile it is, without, of course, ignoring the arguments on the other side. Then write a second version: you are now just as strongly against shiftwork. Using exactly the same evidence, write to convince other people how damaging it is. Now, as a third exercise, write the same information in a neutral, objective way. In writing the three passages, use especially the two techniques mentioned above: order of words, and linking words and phrases.

1. Shiftwork gives you the opportunity to work in a small, dedicated group.
2. It has been suggested that shiftwork can lead to long-term health problems.
3. Shiftwork often allows you more variety and individual responsibility in your work.
4. Shiftwork makes normal family and social life difficult to achieve.
5. You may have extra holiday time and extra money by working shifts.
6. Shiftwork may isolate you from decision makers at work, and make it difficult to get help if you need it.

Summary

- Good style is appropriate to the needs of the reader.
- Good style has its ABC: accuracy, brevity, clarity.
- Decide whether active or passive is appropriate and how personal the tone should be.
- Follow national, international or professional conventions in presenting signs, symbols, units of measurement and abbreviations.
- All tables, charts and diagrams must have numbers and titles for easy reference.
- When using an equation editor, check accuracy, if necessary from a hard copy.
- Make the purpose of each equation clear and explain what each variable represents.

- A well-chosen example helps the reader's understanding and gives life to the text.
- References should show full and accurate bibliographical details and should be consistent in form.
- Avoid abstract words as far as possible. Use simple, direct language.
- Listen critically to your own work.
- 'Link' words and phrases guide the reader through the document and improve the flow of the writing.
- Remember to use the checklist at the beginning of this chapter!