

Technical Report Writing



Learning Objectives

- When you have completed this workshop you will be able to define the key concepts associated with Technical Report Writing and you will be able to:
- Identify the main obstacles to effective Technical Report Writing and how to avoid them
- Understand the nature of Technical Report Writing from the perspective of the writer and the reader

Learning Objectives

- Understand a range of tools and techniques for Technical Report Writing
- Use these techniques to build an effective process that can be used to deliver professional results on a consistent basis from Technical Report Writing activity
- Explain the benefits of having an effective Technical Report Writing process in the organization

Introduction



Technical Reports in the Organization

- Technical reports may be required for a number of reasons such as:
 - Detailing activities and results associated with investigating a customer complaint
 - Proving that a particular process or product has been validated and meets specifications
 - Providing reference material as part of a development project

Technical Reports in the Organization

- The users of Technical Reports may be personnel from within:
 - The department or organization
 - The corporate structure
 - Customer organizations
 - Regulatory organizations

Technical Reports in the Organization

- The value of technical reports may be that they provide:
 - Reference materials that form part of the knowledge bank of the organization
 - Documentary evidence of investigation or validation of products and processes

Technical Reports in the Organization

- Technical Reports are only of value if they are:
 - Based on fact
 - Accessible
 - Accurate
 - Complete
 - Compiled by people who are competent

Technical Report Writing

Quality

Data & Information

Information Uses

Information Mapping

Total Quality in Technical Report Writing

- Apply total quality principles to writing Technical Reports
 - Quality is conformance to requirements
 - The goal is to achieve zero defects
 - The cost of quality is the expense of doing it wrong
 - The motto is - 'do it right first time'

Quality Levels

- There are five levels of technical report writing process
 - Level 4: Managed and sustainable
 - » A robust process is in place and managed
 - Level 3: Organized and repeatable
 - » A sound process is in place and is being refined - training is on-going
 - Level 2: Rudimentary
 - » A process is taking place but not always enforced
 - Level 1: Ad hoc
 - » Little or no coordination of technical report writing
 - Level 0: Oblivious
 - » technical reports are written by whoever has time

Data and Information

- Raw data must be gathered
- Raw data is essentially useless in a technical report
- Raw data has to be translated into information
- Translation leads to:
 - Increased knowledge
 - Increased understanding
 - Increased usefulness

Information Uses

- Information is used for three main areas:
 - Planning activities
 - Monitoring activities
 - Controlling activities

Information will flow between all three

Information Mapping

- Information mapping is designed to allow the information to be presented in its most useful format
 - Analysis
 - Key areas - purpose, audience needs, information types
 - Organization
 - To create an overall structure based on results of the analysis
 - Presentation
 - To format the information to make it accessible to the intended audience; this involves some translation

Writing Communication Media



Written Communication

Advantages

Disadvantages

**Regulatory
Implications**

Common Problems

Using the Written Medium

- Advantages
 - The report can be checked and corrected before release
 - The recipients can go through the report at their own pace
 - It is permanent and traceable
 - It allows the sender to avoid direct contact and remain clinical about the content

Using the Written Medium

- Disadvantages
 - It takes time to get the report right
 - There is a requirement for a managed process
 - It is permanent and traceable
 - It may be bulky
 - Not everyone reads it in its entirety

Regulatory Implications

- For heavily regulated industries such as Aerospace and Pharmaceuticals, written documentation is the backbone of the audit process in
 - Quality assurance
 - Quality control
 - Production
 - Research & development
 - Logistics
 - Purchasing
 - Accounts
 - Training
 - Technical / Customer Support

Regulatory Implications

- The auditor when looking at technical reports or any other documents is checking for:
 - Conformance
 - Clarity

This is the primary reason why it is important to have a managed process for the generation of technical reports - especially in highly regulated industries such as aerospace and pharmaceuticals

Common Problems

- Common problems are:
 - Too long
 - Too short
 - Too much detail
 - Not enough detail
 - Poor presentation
 - Incomplete
 - Not required
 - Poorly structured
 - Inconsistent
 - Poorly written

Common Problems

- The common problems can be grouped into three main categories:
 - Usability
 - Functionality
 - Clarity

All three are inter-related

Preparing To Write



Preparing to Write

Who, What and Why

**Structuring the
Report**

Layout

Style & Tone

Preparing to Write

- When preparing to write the following basic elements must be taken into account:
 - Layout
 - Information sequencing
 - Illustrations
 - Simplicity of expression

Preparing to Write

- As with all forms of communication there is a need to plan. The following questions should be asked:
 - Why is the report being written?
 - What exactly is the report about?
 - Who will read the report?
 - Where will the report be used?
 - When is the report required by?

These questions help the writer to plan the report writing and content in an organized manner

Preparing to Write

- The following issues must also be taken into account:
 - Schedule
 - Available information
 - Any research or investigation requirements
 - Complexity of the subject
 - Resources available

Who & What

- These questions provide the basic information as to the reasons for writing the report and what it has to address
 - Primary purpose - to provide information
 - Secondary purpose - to do so in a way that enhances your organization

Clarity of purpose is crucial to the generation of a useful report

The Who

- By looking at this question, clarity is achieved in relation to:
 - The intended audience
 - Their knowledge and experience
 - Their priorities
 - Their preferences
 - The writers role in relation to the readers
 - The content must be formatted so as to cover each of these issues

The What

- There are several sub-sections to this question:
 - What is the main subject?
 - What is the primary purpose of the report?
 - What information is required for the report?
 - What level of detail needs to be included?
 - What are the main points?
 - What is the most logical sequence?
 - What is the most effective structure?

Structuring the Report

- Structure is about organizing the report so that it is easy to follow:
 - Main level points
 - Second level points
 - Third level points
 - The level of detail increases as the structure moves down through the various levels

Structuring the Report

- An effective report meets the following criteria
 - Well organized
 - Well presented
 - Complete
 - Focused

Layout

- The layout emerges from the structure and is essentially the outline that guides the writer using the following identifiers:
 - Basic structure
 - Headers and footers
 - Headings and sub-headings
 - Paragraph numbers
 - Dummy tables and numbers
 - Dummy illustrations and numbers

Layout

- In terms of the main building blocks of the report, the Introduction, Body and Conclusion; the order of appearance has several options
 - Introduction, Body, Conclusion
 - Introduction, Conclusion, Body
 - Conclusion, Introduction, Body

The format chosen may depend on the preference of the intended audience

Layout

- Layout is what the reader will notice first, so attention must be paid to:
 - Font
 - Spacing
 - Margins
 - Headings and Sub headings
 - Numbering

Ensure that the document is easy to navigate through

Style and Tone

- The **LEAVES** method can assist here by assessing the report against the following criteria:
 - *Logical*
 - *Easy to use*
 - *Accurate information*
 - *Value to the reader*
 - *Efficient use of language*
 - *Standardized style*

Style and Tone

- The best reports follow the ABC guideline
 - Accurate - the report is factual and objective
 - Brief - the report is short without leaving anything out
 - Clear - the report is understandable, complete and to the point

Tone

- The tone of the report must be professional so the writer needs to check for
 - Over familiarity
 - Abruptness
 - Lack of professionalism

Some Guidelines



Some Guidelines

**Express not
Impress!**

Jargon

Be Specific

Plain English

Conciseness

Double Meanings

Write to Express Not To Impress!

- Where possible avoid redundancies, where a second word repeats an idea that is already contained in the first word
 - A new innovation -- an innovation
 - Very unique -- unique
 - Uniformly homogeneous -- homogeneous

Jargon

- Jargon is not acceptable if
 - A more familiar term can be used
 - The jargon obscures rather than clarifies the intended meaning

If jargon is to be used, explain the meaning after the first appearance and then continue. Do not make assumptions regarding your audience's familiarity with jargon.

Be Specific

- When writing a Technical Report remember that the reader is interested in detail, so be specific
- A tall dryer -- A 10 metre dryer
- Plant -- Oil refinery
- Unit -- Evaporator system
- High Performance -- 98% efficiency

By using general terms, assumptions are being made on the technical ability of the reader. This may reduce the effectiveness of the report.

Plain English

- Being overly wordy clutters the document - use plain and clear English where possible:
- At this point in time -- Now
- With reference to -- About
- In order to -- To
- Due to the fact that -- Because

Keep the English simple to reduce both the writing and the reading time

Plain English

- Single words can also block the use of plain English:

– Implemented	--	Done
– Initiate	--	Start
– Anticipate	--	Expect
– Accomplish	--	Do
– Modification	--	Change

Again this has an advantage for the reader and the writer

Conciseness

- Writing concisely has the following benefits
 - Faster to write
 - Faster to read
 - Faster to review
 - Clarity
 - Less bulky
 - Maintains interest of the reader

Double Meanings

- Terms or words with double meanings can confuse the reader thereby reducing the effectiveness of the report
 - Yield
 - To a chemical engineer this is the amount that can be expected as the output from a process
 - To a non-technical person, it means to stop

Some More Guidelines



Some More Guidelines

Active Voice

Numbers

**Abbreviations &
Acronyms**

Graphics

Tables

Spelling

The Active Voice

- When constructing a sentence it is better to attribute the activity to a person or thing as this helps to focus the sentence and present it in a better context
 - The safety rules were enforced by the supervisor becomes
 - The supervisor enforced the safety rules

Active Verbs

- Verbs give life to the document and will elicit a response from the reader
- Example
 - It is our view that productivity targets be increased by 10% in the production department
 - » using the active form this becomes
 - The production department should increase productivity targets by 10%

Using Numbers

- Some guidelines are applicable here:
 - Use numerals for 10 and above
 - For numbers of less than 10, spell them out unless they have a unit associated with them
 - Use numerals for coordinates in a table or graph
 - Use numerals to indicate the time of day

Abbreviations

- In a technical, environment, there are usually many abbreviations used in everyday communication

- cm centimeter
- km kilometer
- kg kilogram
- MB megabytes

Use the defined abbreviations for the unit to maintain standardization

Acronyms

- As with abbreviations, the technical environment is awash with acronyms
 - QC Quality Control
 - IT Information Technology
 - HR Human resources
 - QA Quality Assurance
 - ASAP As soon as possible
 - IPC In process checks
 - ppm Parts per million

Standardization of the acronyms used throughout an organization is recommended

Graphics

- Graphics are used to
 - draw attention
 - reinforce a message
- Graphics need to be planned
- Graphics have to be
 - Clear
 - Understandable
 - Required
 - Referenced

Tables

- Tables may contain a lot of information and as such they need to meet the following criteria:
 - The table must be essential
 - Contents must be legible
 - Rows and columns must be labeled correctly
 - The table must be numbered
 - The table must be referred to in the text
 - Units must be stated where appropriate

Spelling

- In a report good spelling goes unnoticed but poor spelling is immediately apparent
- Poor spelling detracts from the overall professionalism of the report
- Spell checkers may not always pick up a misspelt word when the new word created is a real word

Writing & Editing The Report



Writing the Report

Writing the Report

SPP tool

Drafting the Report

Writing the Report

- Lay out the document in terms of the headings and sub-headings
- Select out the paragraphs
- Write the paragraphs in the order that is easiest for you
- Aim to get the first draft completed as quickly as you can

Writing the Report

- Use the simple three step SPP procedure
 - Spit
 - When you begin to write, just spit it out onto the page
 - Prune
 - Take a red pen to the draft and slash out all unnecessary words and phrases Rewrite any awkward passages to make them smoother
 - Polish
 - Polish the draft by checking all technical information, tables, graphics, spelling, grammar and numbering

Drafting the Report

- At this point it is important to
 - Get into the flow
 - Try to minimize interruptions and start with the easiest sections to write
 - Don't get bogged down in detail
 - This is a draft, detail can be inserted later
 - Edit when you have finished not as you go along
 - Get the draft completed, then edit the full document

Editing & Reviewing The Report



Editing & Reviewing the Report

Editing the Report

Editing: Content

**Editing: Clarity &
Brevity**

Editing: Style & Tone

**Editing: Paragraph
Structure**

Reviewing the Report

Editing the Report

- The amount of time to be spent editing the document will be dependent on
 - The importance of the document
 - The importance of the audience
 - The time available for editing
- Take a structured approach to editing the report and move it from the rough draft to the final professional version

Editing the Report

- Some guidelines are presented below
 - Try not to edit immediately - leave the draft and come back with a fresh perspective
 - Be really critical on the first draft
 - List any errors so you can learn from them
 - Read to to see if it sounds right
 - Remember if it doesn't make sense to you, it won't make sense to anyone else either!

Editing: Content

- When editing the content, check that:
 - The purpose is clear
 - All main points have been covered
 - Sufficient information has been provided
 - Adequate detail has been included
 - The original intention has been fulfilled

Editing: Brevity & Clarity

- When editing for brevity and clarity, check that:
 - All unnecessary words and phrases have been removed?
 - Technical terms / jargon have been explained?
 - Are sentences of a manageable length?
 - Has the active voice been used?
 - Are there any unnecessary tables or graphs?

Editing: Style & Tone

- When editing for style and tone check for:
 - Professional tone
 - Professional presentation
 - Style appropriate to the message
 - Tact & discretion used

Editing: Paragraph Structure

- When editing the paragraph structure check for:
 - One paragraph - one topic?
 - Subject of each paragraph is clear?
 - Paragraphs not overly bulky
 - Lengths of paragraphs varied to assist reading

Final Editing

- Aim - to achieve a final report which is professional, user friendly, accurate and useful
- Assume the role of the reader and look at the document from that viewpoint
- Check for accuracy
- Check for spelling, punctuation and grammar
- Let the document go when editing is complete

Reviewing the Report

- There are several types of reviewers who may be involved in the generation of a report
 - Project reviewers
 - Peer reviewers
 - Customer reviewers

These may give the report a

- Formal review
- Informal review
- Final review

Reviewing the Report

- Reviewing to be effective must be undertaken using a standard
- Informal reviews may be least useful as they are not always taken seriously
- Final reviews may be frustrated if the earlier reviews have not been standardized
- Formal reviews if undertaken by reviewers who have a heavy review workload may be rushed and therefore not effective

Reviewing the Report

- Assist the review process by
 - Stating the date when you want the report back from the reviewer
 - Highlighting any sections where the reviewer should pay particular attention
 - Noting any missing / incomplete information
 - Agreeing a date for a meeting / walk through session on the document with the reviewer

Summary

- The required outcome is a professional and useful report
- Planning is the essential first step of the report writing process
- Use standard conventions for abbreviations, acronyms and jargon as used in your organization

Summary

- Pay attention to structure and layout so that the reader can easily navigate through the report
-
- Use plain and concise English with correct spelling
- Edit and review before releasing the report
- Actively seek feedback and learn from your mistakes