

Engineering Design Notebooks

Keeping an accurate and readable record of your design activity is an important part of professional design practice. The engineering design notebook contains a record of the ideas, methods and results that pertain to a design activity in which you are engaging. Proper maintenance of a notebook should not be considered simply a class requirement, but rather a habitual activity that will persist in your professional practice. Except where explicitly listed as a *class-specific* requirement, the practices that are described below reflect common engineering practice.

Some criteria to use in assessing the quality of an engineering design notebook are:

- Could an individual with technical training similar to yours understand the train of thought and methodology of your design using only your notebook?
- Could an individual with technical training similar to yours reproduce any tests or experiments you carried out and compare their results to yours using only your notebook?
- Could you review your notebook five or ten years from now and remember why you made the design decisions that you did?
- Is your notebook sufficiently complete that it would support legal recognition of your claim to invention of your design?

If the answer to these four questions is “yes”, you have an excellent notebook.

Format of an engineering design notebook

- Use only a bound notebook. This means that pages cannot be easily removed or inserted without an obvious change to the notebook. Note that spiral bound notebooks do not meet this criterion.
- Notebooks should have numbered pages. If you have a notebook that does not have page numbering already printed, you can add page numbers in permanent ink yourself.
- If a project is sufficiently large to require multiple notebooks, the notebook number should appear on the front cover and/or spine as well as on the title page.
- Notebooks should be well identified
 - Your name and sufficient information to allow the book to be returned to you should be present on the inside front cover (typically organization, name, phone number and email).
 - *For class*, your name and the class designation (e.g., MEGR2156) should appear on the front cover.
 - The front matter is typically contained on a title page or the inside front cover of the notebook. Choice of placement of the front matter may be influenced by preprinted notebook section headers (e.g., page one of the notebook may already be designated as the first page of the table of contents). Front matter includes:

- the company or institution for which the work is done
- your name and title
- project or activity to which the notebook pertains
- volume number of the notebook if there are multiple volumes
- date of original creation of the notebook
- date or retirement of the notebook (added at the end of use)
- contact information of the author (e.g., address, office number, phone, email)
- (optionally) supervisor or project engineer of the project on which you are working
- A Table of Contents should help organize the notebook.
 - leave at least two pages available for table of content entries that you will make while using the notebook
 - entries should have both a subject and page number
 - entries should tag major design ideas, tests and other items that would help you or another to later find a significant portion of the notebook
 - more complex notebooks often use indentation to further organize subjects in the table of contents
- Optional tables may be added after the basic table of contents. This is unlikely in UNCC design classes, but is helpful where a more complex project is being documented.
 - A table of supplemental materials can be used to identify items which are considered a part of the notebook but which cannot be physically incorporated into the notebook. These most commonly comprise large drawings, computer files and physical models.
 - A table of charts may be useful where you know you will have a lot graphical data.
 - A table of drawings may be useful where you know you will have significant drawings.
 - A separate table of tests is appropriate where you are recording evaluation or qualification test data as a major part of the effort being documented.
- *For UNCC Design classes* you should maintain an effort log at the back of the notebook.
 - begin the log several pages from the end of the book so that there is room for the likely number of entries associated with the class or project
 - record time spent on the project noting the **date**, **time** spent, and **activity** accomplished
 - if a formal project plan has been established, the activity reference should identify the work breakdown structure (wbs) element of the project plan
 - if you work on several different activities associated with a project, there may be more than one lines on entry in the log for a single day

Maintaining the engineering design notebook

- Work neatly and with enough elaboration that you or another engineer will be able to understand what you have done.
- Make entries in permanent ink.
- Date all entries using the full date (including year).
- Make entries consecutive, working from the front to back.
- Do not leave space for backdating entries. If you wish to leave some blank space, place a diagonal line or “X” through the space to ensure that information will not be added to the areas later.
- If you are adding material related to a previous portion of the notebook (e.g., further describing concept 1 after having introduced concept 2), note that this section is “continued from page xx” and mark the previous section with “continued on page yy”. This will help a later reader see all of the material you intend. If the “continued on” notation will be on a previous date, see the comments below relating to backdated notes.
- Record all original concepts, data and observations as early as they occur. This will establish the date of origination of ideas and may be important for patent purposes.
- Entries can be brief, but it is important that they be understandable to another engineer.
- Figures, charts and drawings should be labeled; variables in equations should be defined; and units should be maintained throughout.
- Pages that introduce significant new ideas should be signed. Some employers will require that you obtain a second (witness) signature on such pages. Many employers will require that all pages of the notebook be signed. When all pages must be signed, it is usual for the notebook to have preprinted signature blocks.
- Supplemental material such as computer printouts, printed drawings or copies of portions of advertisements may be affixed to the notebook as a regular part of the entry. When including such material, reference it in the text of your writing (e.g., “The following drawing depicts the attachment interface of the Acme igniter.”).
 - Supplemental material should be permanently affixed using staples, tape or glue (if you use glue, select one that is specially made for this purpose).
 - Supplemental material should be placed as a running part of the chronological flow of the notebook, as if it was your own text.
 - Your text should indicate the reason that the supplemental material was included, including any conclusions you draw from it.
- Corrections may be made to your notebook, but they need to be made in such a way that both the original error and the correction can be seen (not infrequently the original is found to have been correct after all, and it is useful to be able to read it).
 - Draw a single thin line through the error.
 - Never use correction fluid or correction tape.

- If the correction is made after subsequent text has been entered for the same date, you can make a note of the location of the corrected material next to the struck-out text.
- Corrections may sometimes be necessary to entries that have been made on a previous date. Practices for addressing this may vary somewhat between employers. The procedure given here is a common approach.
 - Any correction of an entry from a previous date must be clearly discernible from the entry itself. This is most easily accomplished by using a different color ink.
 - The correction must be dated and initialed.
 - The scope of the correction must be clearly delineated, typically with a bracket around the target entry.
 - A forward reference to the page in the notebook containing an explanation of the correction must be made.
 - An entry explaining the nature and reason for the correction must be made in the notebook on the date that the correction is made.

Supplemental materials

- All supplemental materials should be referenced in the notebook by both title and storage location. It is important that a system for storing supplemental materials be established so that they may be recovered reliably. Where supplemental materials constitute a significant part of the engineering design associated with the notebook, thought should be given to archival storage (such as creating a microfiche of drawings or burning a CD ROM of computer files for inclusion in the notebook) when the notebook is retired.
- Large drawing files should be maintained in such a way that the date of a drawing is positively associated with its entry in the notebook. This means that if the drawing filing system is not by date, then the date must be clearly and indelibly marked on the drawing, and the drawing location unambiguously referenced by the associated entry in the notebook. The drawing file system should be considered an extension of the notebook and all of the notional requirements of the notebook apply equally to the drawing files.
- Computer files present a particular challenge because they are so easily moved and overwritten.
 - Files should be organized according to a scheme which is fixed so that all notebook references can be unambiguously resolved.
 - Files which are included in notebook entries should, where possible, be marked as read-only in the computer file system to avoid inadvertent changes after the entry date.
 - A recommended practice is to include the date of the file as a part of the file name. This is particularly important in cases where the computer file system maintains either creation or last-copied date, and the more important last-modified date may be lost.
 - Where files require particular software (e.g., Pro/Engineer Wildfire 4.0) to be read, the required software should be recorded in the notebook, including version number and release date, if available. While this information need not be recorded for every single file reference, it should be easily found (through, for example, a table of contents entry) in the

notebook.

- Where possible, open-standard file formats should be used. This enhances the possibility that the computer file will be readable at a later date. For example, ASCII text files are preferable to binary .doc files when either will carry the same information. Unfortunately, the availability of such standards is quite limited for complex drawing or schematic capture files.

Revision	Date	Author	Description
	09/07/09	Patterson	Original document
A	09/07/09	Patterson	Correct proofreading errors
B	09/29/09	Patterson	Modify description of front matter to accommodate notebooks that have preprinted T.O.C. beginning on first page. Add footer and revision block.