

Thoughts on Organisation and Development



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Introduction

This work collates thoughts from my personal experience as an engineer with a few years experience. It includes activities and a set of effective soft skills to support graduate engineers in their first roles. It will help you improve the quality and consistency of your work and will bring the control of your workflow back into your hands. Ultimately, it will increase your level of organisation, freeing you to focus on your development as a professional.

This is not quite a book, not quite a pamphlet, covering primary career skills. It is an active reference guide with activities and insight into the practical aspects of work in an engineering office.

Who is this guide for?

Final year/industrial placement students, graduates and new entrants to the engineering industry. The techniques and ideas here are suitable for new entrants to other industries.

As the engineering industries and wider economy make progress through challenging times, the companies at play in these markets are subject to external cost pressures causing internal 'streamlining' of departments. It is then crucial that graduates take full value from the on-the-job training and coaching that forms the greatest part of their personal development at work.

This guide exploits an opportunity: underpin the strong technical training of new engineers with a focused guide to lower-value admin skills. This will help graduates learn how to operate in an office faster, freeing them to deliver high-value work sooner in their career. This will release value to businesses and create a lower stress entry to the workforce for new graduates. This will bring the benefits of:

- ▶ shortening the gap in skills development and shortcut some development lessons – learn from old mistakes early
- ▶ allow the design of new ways of working – by engineers designing, prototyping and trying new things
- ▶ encourage the application of new ideas to markets – ideas generated by new engineers

This material aims to improve your organisation skills enabling you to work smarter, not harder, using resources both personal and corporate, more effectively.

A successful workplace incorporates integrated thinking beyond simply “what are my tasks and workflow?” but to see your efforts as part of a greater project/company. More importantly, know how your workflow feeds other exercises like scheduling, manpower planning, and other tasks.

Take note

Daybooks

Use of daybooks

A daybook is a notebook to extend your mind and reduce dependency on your short-term memory. It is a multipurpose tool to note down your to-do lists for work, home and social life, record professional development activities and your participation in meetings. They are helpful to capture any ideas you might have and to stop you forgetting them, taking the pressure off and enabling you to pick them up later.

There is a process for forget-remember-defer-forget which the use of daybooks seeks to interrupt. The following flowsheet illustrates the point.



Fig. 1 – The bothersome cycle associated with deferring tasks, not writing them down, then forgetting them altogether.

ACTIVITY

Take a piece of paper and note down everything you are doing right now, and everything you will need to be doing later today, this week, etc.

Then, here's the interesting part: when you have completed this, allow your mind to move to the other bigger things: your life goals, and your dreams. Take these thoughts out of your head and put them onto paper. This is the first step to tackling them and making progress.

This way, you embrace your life goals and your daily activities into full view so you can organise yourself to achieve them. This takes away the feeling of forgetting.

The outcome of this exercise is to disrupt a cycle of anxiety into a stream of thoughts and work which flows with less stress and more achievement both in your life and your work.



Fig. 2 – Flowchart for the work-note-work approach to record your thoughts and achieve progress on your ideas.

Daybooks are useful for day-to-day organisation and for building a record of your work activity as a basis for your career development. It records each thing you do and how you do it, positive/negative outcomes, etc. It will be shown later as an input to a personal development plan to ensure you take the right steps to meet your potential and reach your development milestones. It also supports your application for a professional certification. Here, you can use your record to identify gaps in your experience and skill set. This is useful to highlight your strengths and your areas for improvement. This provides an appropriate starting point to plan development actions and nourishing activities to grow your competency in these areas.

ACTIVITY

Which ways do you make notes for yourself? How do you organise yourself? Think about how effective each technique is. Think about which of these methods you use each day in your work. How could you change things to become more organised, more fool proof in your planning, and so minimise your anxiety?

In addition, arriving at a meeting or speaking to a colleague with a book to hand to take notes gives the impression of an organised professional in motion. In the same way body language communicates 90% of what you want to say, and often says more than you speak. In this way, you show others that you are equipped with the tools to perform well.

Albert Einstein had a similar philosophy on the application of his memory. When asked what his phone number was, he walked off and returned with a phone book, pointing out his number out to the interviewer. His reasoning was that information which can be memorised, can be referenced. In his mind, he did not need to memorise his phone number, merely to consult the phone book as a reference, leaving him free to focus on the activities at hand.

Suitability – where to start

For engineers, carrying a notebook is a useful habit to develop your work in a design office or on a site. Being able to make clear and quick notes is an important part of your practice, especially when capturing crucial details about a design or some process conditions.

There is no hard and fast rule about daybooks but above all, it should work for you. Firstly, the book should be of a practical size for your use.

Digital notebooks also offer the option to record your notes in electronic format, making them searchable and very useful for preparing your report for performance reviews or coaching sessions.

If you're working on a creative, early-design phase project and need blank pages or decide that lined paper is not fit for your purposes, go ahead with something you are comfortable with. Choose unlined paper in this case. Remember you are crafting your career and to do that, you need to develop tools to work for you. Do not fit yourself to the tools available if they do not work.

In addition, keep one notebook only at a time. This forces you to centralise all your notes so you have a consolidated point of reference. Keeping multiple notebooks for different purposes can be troublesome if you pick up the wrong one in a hurry.

Legal impacts

Notebooks are invaluable in a legal sense too. The unexpected benefit of using daybooks and engineering notebooks is as a legal record to prove your diligence as an engineer. The books can support your case if you are drawn into a legal dispute. The notes you write serve as a record which is permissible in court. However, not all notebooks are equal in this regard; the notebook must have a bound spine. This is a proof point to verify that pages have not been removed.

As junior engineers, being drawn into legal proceedings or called to court for your work is less likely. At this stage in your career, most documents will be signed off and checked by more senior responsible engineers. Generally, the duty of more senior personnel is to verify the standard of work.

However, in the modern engineering workplace, time, cost and schedule constraints and progress pressures may mean a project subscribing to a "doing more with less" philosophy achieving progress at the expense of thorough checks. Protect yourself and develop consistent and forward-thinking habits early in your career to save embarrassing and painful lessons later.

More likely, however, is that the records you make can help you if you are drawn into disputes about mistakes or organisational issues. In this way, your daybook is invaluable from day one.

As you work on an engineering project, your design decisions and judgments on the soundness of a design have implications on the ease of commissioning and subsequent operation. Clients may choose to proceed down a different route with the design. As your views and others' may be in conflict, there is potential for discussions to go back and forward. Prevent any confusion on your part and use your notebook to record that you shared your concerns and made your objections clear.

In certain, non-office environments, specialised notebooks give better support to record data and ideas. For example, when moving about on site, often there are few flat surfaces to lean on. Here, a small notebook to put in a boilersuit pocket for site walks is perfect to capture your observations. If there is a need, these notes can be copied up later. The smaller book removes the inconvenience of carrying a large notebook. A notebook with squared paper is readily used for process design, isometric or datasheet design.

Remember this: **Poor Preparation Precedes Pitifully Poor Performance**

See the work you do as a series of recipes: prepare all the ingredients well, the recipe becomes much easier to follow, and the results are delicious.

Summary of daybooks

Using notebooks is a good habit to develop. They're useful for:

- ▶ day-to-day organisation
 - ▶ record your activity, learning outcomes and to-dos on a daily basis. Group your activities together and drive your workflow day by day. Tick off the tasks as you go. Ticking off the tasks to complete in a daybook is also a small psychological boost, and helps a new graduate see minor and steady progress toward their goals. Leftover activities go to the top of the next day's list. Rewrite tasks on a new page to keep the list of activities together. It allows you to think about the work ahead, and choose which piece to tackle first. Assign your higher priorities but also make scheduled time for personal development activities. More on this later in Managing Expectations
 - ▶ building graduate confidence and self-esteem by allowing the graduate to tick off completed items. This can align with most engineers who are highly results-driven
 - ▶ organise yourself this way and save mistakes. Increase the consistency of your work and reduce the time spent fixing simple mistakes. This increases the value of your work



- ▶ to-do lists

- ▶ the bulk of your notes are daily notes and to-do lists. By putting the task into your daybook to-do list, you have reduced the burden on your memory, freeing up your focus to resume the task at hand

- ▶ preparation for meetings

- ▶ clarify the outcomes you want from the meeting
- ▶ have the desired meeting outcomes written down on a different sheet of paper to the book which you record meeting minutes in – this will allow you to see the list
- ▶ what input you will provide?
- ▶ print hand-outs for the attendee
- ▶ check that the room has the necessary communications equipment beforehand
- ▶ familiarise yourself with the IT equipment beforehand to prevent delays
- ▶ do all attendees know about the meeting? Short notice invites can be missed. Call to confirm attendance



• record your learning

- often in a new career, there is a lot of subject-specific terminology to learn. Have your daybook to hand and record these learnings for reference. To others, appearing to make notes is a body language element which demonstrates your interest in the subject and your craft
- record your professional development activities through your to-do lists and include specific entries on learning points you have mastered. Write concise professional diary entries for your actions and how that relates to development goals for your professional body (IChemE, IMechE, for example)
- your daybook entries make up a reference for daily progress on your actions and deliverables. This helps you manage your projects more smoothly. For example, learning about a software package, how to structure a report, how to design and populate a technical calculation note
- keep any helpful guides, printed pages or web addresses for useful resources. Keep these separately to your regular notebook so that reference information is not lost amongst short term notes. Likewise, reproduce useful graphs, charts or insightful diagrams you come across. They are useful for deepening and broadening your understanding of the industry
- remember, as a new entrant, knowing your role and your industry is important. It is also crucial to know how your role works as part of economies and within the globalised market for energy and engineering services

ACTIVITY

Meetings – Come prepared with your own personal contributions and know what you want from the meeting. Be aware of yours and others' contribution to the meeting. Foster the success of the meeting by actively participating. A good rule of thumb is if you're not contributing in a positive way – you should not be there.

Notes in meetings

Colour coding

Depending on your learning style, or affinity for colour, use colours to differentiate between the different kinds of notes. The following is a typical colour coding system:

BLUE – To-do list items. Mark the end of the line with a checkbox for completion.

RED – Follow-up activities or a confirmation that something has happened, and general notes.

BLACK – Condensed professional development summary notes in relation to required learning outcomes for Chartered membership.

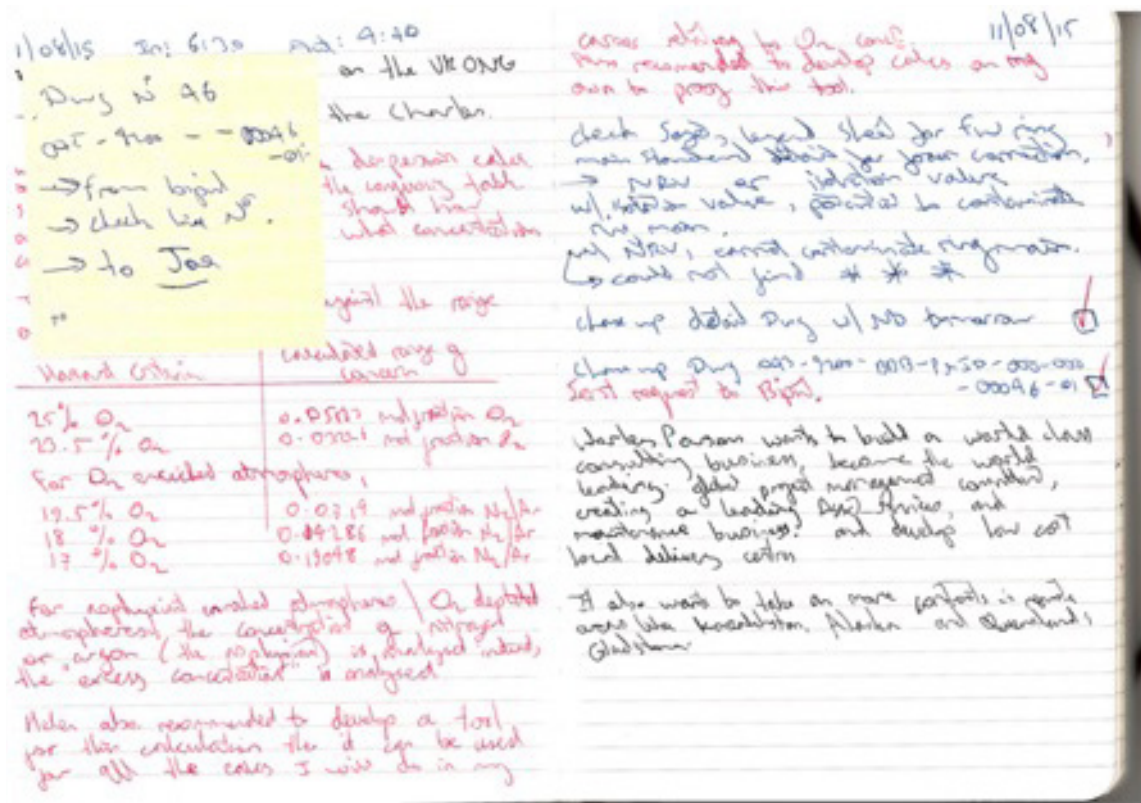


Fig. 3 – Colour-coded daybook entries showing input data for a safety study, some tasks with check-boxes, a sticky note with other tasks from a colleague and a specific professional development entry.

Diagrams

Use diagrams to illustrate your learning or capture an idea, or ask others to draw it out and copy their illustrations into your notebook. These drawings can be invaluable for growing your creativity and knowledge as you go through your career.

Engineers often use drawings to explain concepts, using flowsheets to communicate ideas saves a lot of words; especially important in limited meetings with clients or suppliers.

Be on the look out for a flip chart and pens (or increasingly – dry-wipe walls or whiteboards) and be assertive in using them to break a misunderstanding or a circular argument as you show them what you are thinking.

Sticky notes

Like the real-world equivalent, the Microsoft Sticky Notes tool allows you to pick up a piece of text and copy and paste into another application. This saves time when moving text between different applications, spreadsheets. Using a word processing document for the same purpose adds time as you must locate the file on the machine first.

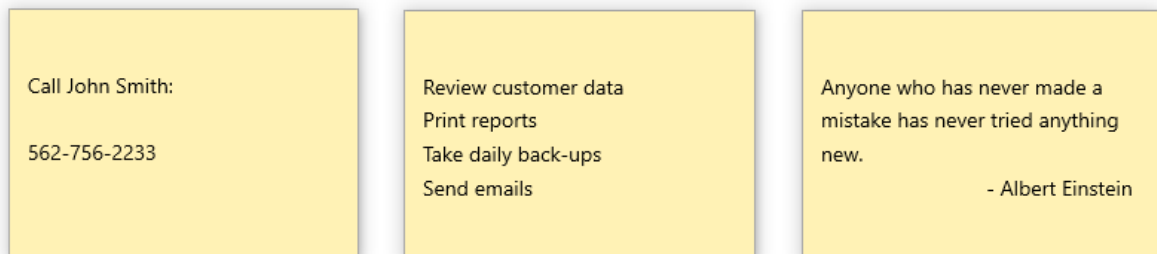


Fig. 4 – Sticky-notes used through the Microsoft Sticky Notes tool. Good for a memorable quote or a retainer for some often-used phone number.

Sticky Notes is particularly helpful when completing data entry, producing an equipment datasheet or writing a series of very similar emails – e.g. progress reports and updates to your team. The strength lies in being able to pick up a string of text and drop it into other places quickly, saving repeated typing.

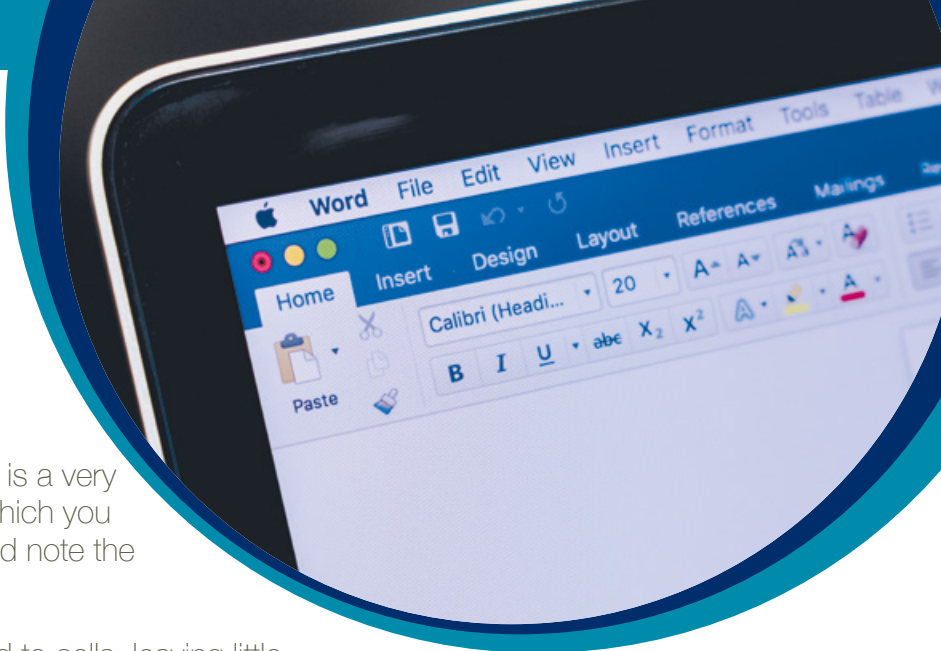
WARNING – Copy-paste techniques and tools reproduce text strings word-for-word. As a result, the copied text is exactly the same as the source text. Take care to check your document to ensure that you want the exact same wording.

Using Track Changes and comments as note-making tools

Track Changes in Microsoft Word is a very useful tool to highlight changes which you have made to your document, and note the reasons for these changes.

In excel, comments can be added to cells, leaving little red corners to the applied cells. The comment box flashes up when the cell is hovered over.

In a complex self-made calculation sheet, the kind which you will build over years to automate the rote calculations, this kind of annotation is crucial to capture your thinking and the basis for your work. Particularly useful and time-saving if you need to validate your calculations later.



Alternative note-taking techniques and methodologies

Here are some other examples and explanations of note-taking methods out there:

Bullet journaling

Useful for recording the specific learning outcomes and development goals and examples of meeting targets. Find examples at Bulletjournal.com. Possibly the most simple technique.

Sample bullet lists

You could fix this one up by making the effort to place emphasis on keywords related to professional development.

Use different notebooks

Despite my earlier advice to only use one daybook, this technique can be successful but requires great discipline to get it right. You can use one notebook for to-do lists, one for general notes.

Develop your own system

Try things out and determine what works for you. The goal is to capture your information in one place, in a format you can find your way about easily.

ACTIVITY

Try each of the techniques mentioned earlier for a week each. Through their use, for both home and work life, try to see the benefits and limitations of each method. Use your learnings to design your own note taking system. Generally, you will find your own method evolving as you start from an existing system and refine and modify it.

Try to notice your general level of focus, stress and feelings of organisation and satisfaction with your progress each week with each system. Rank them on these markers out of ten say, and also compare them to the current system you are using.

If you notice some benefit from parts of one system, borrow, mash up and integrate that idea into your system, creating something new.

- ▶ what are the things you notice about the systems you have developed?
- ▶ what works best?
- ▶ what few things combined, or modified, make your systems better?



Time-keeping

Starting my day, I open my notebook, take a fresh page, note the date and write IN (and arrival time) and OUT at the top of the page.

Your notebook is a powerful tool for recording the following:

- ▶ IN/OUT – personal time management – ensure you don't work hours over your contracted time
- ▶ manage holiday allowance – track days taken and what remains of your annual leave. Provides a record for planning your holiday breaks
- ▶ unplanned absences – allows you to keep track of your days away for recovery from an illness
- ▶ time spent in meetings and times and dates of next meeting – write them down before you update your email calendar

While a notebook is a great way to record your time – also explore the use of a digital record of your time keeping. This allows you to have it all in one place, instead of spread across the days of your notebook.

This is helpful when putting together a timesheet – a record of how you spent your hours at work. Working in the engineering industry on large and small projects, it is important to be able to determine where time was spent on different activities for budgeting and scheduling. As above, time and budgets on projects are not your direct concern as a junior engineer. However, it pays to first see, then get to grips as you develop in your career. As you become more senior, your input and experience would be drawn on to estimate a budget for a piece of work.

N.B. Not all firms use time-writing as part of project and resource management. Be aware that companies are increasingly being driven toward results-based invoicing to clients. This is shifting projects away from time-writing and instead, delivery KPIs instead.

On a separate note, it helps to record when doing overtime (paid or unpaid) as you can demonstrate the exact times you entered and left so you're not overworking yourself. The record here is to cover your back and explain to managers but serves up a practical benefit.



Email and calendar tools

Where to start

To use the techniques proposed in this guide, you will need to switch over from an existing email organisation system to a new one. The key is flexibility: you may have systems which already work for you. This guide presents other ideas, by combining and adapting your experience with new systems, to improve your way of working.

You can break away from an existing system with these three steps:

- 1) Set up the system you want to use to store and organise your emails – set up all the folders and sorting preferences for your email client.
- 2) Immediately start using the new system – sort your email into your new folders, delete junk and immediately sort other items for action. Dump the remainder into a folder called 'old system'. Archive your existing inbox and drag the contents of your inbox into the 'old system' folder.
- 3) Periodically go back and sort the old system until you're up to date – before long, all the relevant, immediately important emails (you'll be surprised with how few of these there are) will be sorted into the folders and you can retain the rest in an archive for later reference.

Now you have a clear starting point for using the new system. Over time, integrate important emails from the old folder into the new structure. Alternatively, pick and sort the most important emails and delete the 'old system' folder.

Organise your email

Set up an email folder for each subject matter you're managing. Make a folder for personal emails and Admin/HR material too. A typical email folder structure may go as follows:

- ▶ projects – one folder for each project or ongoing responsibility, covering tasks which are not straightforward to complete or require the input and buy-in from many people or many parts to complete
- ▶ communications – keep a record of email correspondence relating to design decisions with potential repercussions. Having your own solid record of proceedings helps you when you need to argue your case
- ▶ sent mail – proof that an important email was sent is sometimes required to support your case. Accordingly, place a copy of these emails in a folder for your reference. Or print and store the entire thread of emails



- development – any activities you are undertaking as part of your work which meets your professional development goals
- training – store material relating to Lunch and Learn activities or information from any company or third party training course you may participate in
- travel/expenses – store your business travel information here. Sort emails relating to expenses and logistics (times and dates, places and contacts) to prepare for these visits
- social – there will often be circular emails following an office party or social event with your workmates. It is handy to store these out of the inbox so they don't get deleted
- information technology – in the same vein as HR, keeping track of IT bulletins or details of your IT requisition and software licences assigned to you is helpful when diagnosing errors or swapping machines

Printing email

Today, many offices attempt to go paperless, with varying degrees of success. Do your bit and save PDF versions of the emails you want to record and store. This saves printing as you backup important email conversations. Save these emails on your working drive. Soft copy formats also enable you to attach them to emails later like any other attachment.

Colour your inbox

Some email programs enable you to colour code each email in your inbox. The advantages here include colour coding your emails by personnel, by the project team, discipline, etc. This helps you highlight high priority or essential information emails in an instant. This is especially the case with Lotus Notes. Similarly, the colour assignment makes it much easier to detect spam and phishing emails which have no assignment.

The other most popular email tool is Microsoft Outlook. This permits the use of colour to tag emails so certain personnel stand out in the inbox.

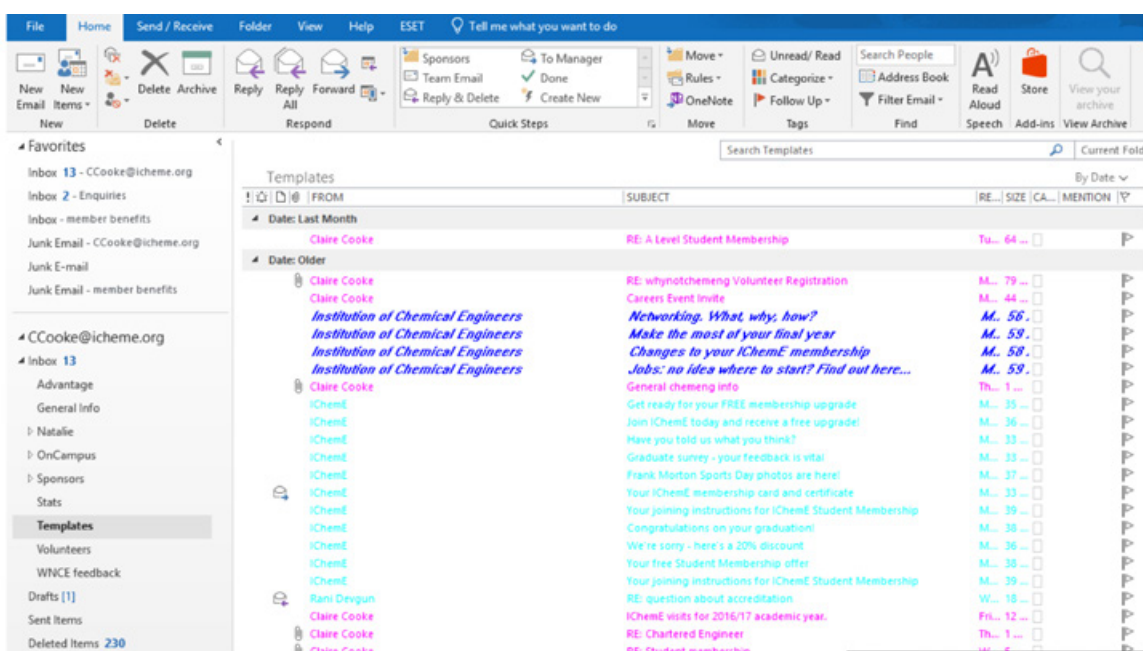


Fig. 5 – Microsoft Outlook can also provide coloured email functionality.

Industry insight

Companies use different software for email, meeting organisation and HR resource use. Be aware of this when sending meeting invites and emails, the above-mentioned email clients do not 'talk' to each other well when arranging meeting invites. Sometimes the meeting appears as an email, instead of entering into your calendar tool, sometimes the invite is not received at all. Do not underestimate the potential for IT to fall over on a regular basis. IT support varies from company to company, and as many firms use decentralised worldwide IT support, they are often available all the time to help.

Calendar event prompts

Your calendar can be more powerful than a rota of meetings or training sessions ahead. You can set it to prompt you on your activity lists.

To do this, set a calendar event for the activity to remind yourself of some time in the future. Add some keywords in the details of the event description and make it easier to remember. When the time comes, the calendar notification will pop-up to alert to the task to be done. This technique lends itself to chasing up an ongoing project. These tasks deal with “where are we on this?”.

Use a recurring reminder, (recurring every week, fortnight, month, for example) for activities such as data downloads or reporting progress to others. This automates the process of checking and removes the burden from you. Automate basic tasks where you can. This increases the consistency of your work, reduces stress and returns otherwise wasted time, to you.

Set up email templates

Regular monthly reports are often part of a graduate's agenda, to share their progress and activity with the line manager. If the content of the messages takes a regular structure, it can be useful to use an email template for that report. This standardises the format and content of the report and saves time writing and checking for errors. Store templates in their own folder.

Create this tool for yourself:

- 1) Select your regular report email.
- 2) List key information that will be shared in each report.
- 3) Use a sent email as a template. Strip out the specifics for that email including dates, specific data and any reference to that month's trends. Place bright coloured text as placeholders where you will update the responses each time the email is sent.
- 4) Save this email in your drafts folder or, if it was composed in a word processing package, save it in a templates folder.

This reduces the task of reporting to simply updating data fields (which can be done with macros and smart links, and by adding specific comments at the end of the email. As with many of the ideas shared in this guide, each saves a little piece of time. When taken together, they accumulate into a significant saving in time.

N.B. When using templates, review the content of the finished email. This both ensures that the data is correct, and also highlights where an auto-report macro may have gone wrong.

High integrity email

There are some ways you can make your email stand out in the inbox, be more readable upon opening, and help your reader to action your requests. These techniques can improve the integrity of the email: removing ambiguity about content, providing clear requests for action and demonstrating professionalism.

Urgent/priority/high importance email

Using these options all the time, over time, reduces their effectiveness; when everyone uses priority status, who takes priority? When using high priority with a genuine need, follow up the email with a phone call and reiterate the need for expediency. Being genuine and honest helps others understand and may make them more open to help you.

Maximise the effectiveness of your urgent email by not calling the contents 'URGENT'. Use different words to demonstrate the high priority of your work. Words like 'urgent' and 'important' are used all too often in the office environment. Stand apart from the madding crowd and speak in a more influential way to capture your colleagues' attention.

Office drive-bys

Less violent than it sounds, but do not be unsettled by colleagues dropping by with 'highly urgent' tasks with rapid-fire words and hand gestures. Remember to observe the space from your perspective: "Their poor planning is not my time crisis". Use this thought to distance yourself from the emotion of the other person.

Observe the greater system in play: decisions made elsewhere on a project may create a need for some swift work to be done. As a new graduate worker, be unflappable and cultivate your self-respect, not bending over backward to pick up someone else's issues. Remember: at that time, you may solve the last-minute panic and come out a hero.

To this end, be wise, and build your interrogation skills. Learn to question and discern a genuinely crucial task from others that are dumped on you. Ask what the problem is, what the scope is, and push for realistic deadlines. Write all these things down and bring back your power to negotiate. At this time, you can also start estimating how long you will need to complete any work. Make sure to build some contingency time in to allow extra checking or rework, and advise the colleague of these considerations. Do not become a victim of an office drive-by from peers or senior colleagues.

Make sense

Sometimes a barrage of information will arrive in an email. It may be the case that, while it is informative, it lacks direction and the logical next steps may not be clear. Respect yourself and your sender and question the direction of the email. The trick here is to use an 'active response'. As with active listening, active responses show the other parties that you are paying attention and help open them up to answering your questions.

Bullet the main points of the email to demonstrate "As I understand it, this is where we are", and question how it all fits together to bring progress.

Confirm calls

From time to time, important decisions are made by spoken word and there may not be a written record of this decision being made. Normally a minuted meeting would record these decisions and confirm what was said. However, if this situation arises, simply send an email with the content of the conversation and request the other party confirm this. Upon receipt, save the confirmed email in a safe place for future reference.



Participate in meetings

Prepare

Ensure the success of meetings by providing adequate preparation and forethought. Initially, understand that the preparations may take some time. As your confidence and experience with meetings grows, less time is required for coordinating the meeting, and you can choose to focus on preparing the inputs.

Meeting preparation includes:

- ▶ booking meeting rooms
- ▶ organising refreshments
- ▶ printing handouts for participants, if required
- ▶ confirming that IT and telephone conferencing are available

There may be a technical clerk or bookings manager dedicated to managing this activity for your office area. However, with reductions in headcount and emphasis on efficiency, you may have to book your own meeting rooms using online booking systems. If a PA is available, confirm that the room is ready for you prior to the meeting to prevent delays.

Preparation of meeting content may include:

- ▶ ensure that a safety brief is ready for that room – check ahead for any scheduled fire drills. Pass this information to attendees
- ▶ ensuring slide packs are ready
- ▶ supporting documentation and relevant technical drawings are ready
- ▶ recording software is available to minute the meeting



Participate

You can either be early or late to a meeting; and that's it. Show your best self and aim to arrive a few minutes before the meeting starts and be ready to support the chairperson in preparing if needed. If there is a delay to the start, take the opportunity to run through the agenda while any IT issues are fixed or pass the sign-in sheet around. This lag time can also be taken as an opportunity to start delivering a safety moment and the fire escape routes, a key safety point or scenario and the story which illustrates the point.

Safety moments

Safety moments are what they sound like – a brief consideration of a specific event or safety learning example and the outcomes from a hazardous loss. Many engineering firms will start a meeting with a safety moment and many senior executives personally name safety in design and operations as a high priority.

Safety moments identify the common and uncommon scenarios which present a harm to personnel and assets. They can be brief and overt or more subtle and thought-provoking. Choose wisely to help frame the meeting for the participants. The more perspectives available to us as engineers, the more we can design out and mitigate the hazards.

Attendance lists

Attendance lists are a formal record of who attended the meeting. They record the name, experience (as a demonstration that a team of competent persons had convened), the discipline/role of personnel and the employing company. This list is useful as a register of the stakeholders of the meeting. However, it also serves as a list of personnel within each of the departments represented. Accordingly, you can send your queries or actions from the meeting to these people. It also provides a contact on these matters in the future, distinct from the meeting.

Invariably in the engineering industry, knowing someone who knows something crucial, is as important as knowing something yourself. Develop a good network of contacts in different areas of expertise. Act pragmatically, make things happen proactively and drive progress where you are. This work ethic and creative approach are both recognised.



Take the minutes

Meeting minutes are a formal record of a discussion: a short, structured report of the key points and actions which resulted from the meeting. They are recorded by a designated member of the group and entered into a project template for consistency across all meetings. The minutes are then distributed to each member of the team for their comments. Each member agrees on the written account of what happened and the actions arising. The minutes are then signed and issued as a set-in-stone record.

You may have experienced meeting minutes and acted as a scribe in a group project at university or at a social club meeting. In industry, where project schedules and the impact of purchase orders are discussed, there is a time-money impact. Make a positive impact and create value in meetings.

A typical minutes of meeting record may have the following typical structure:

- ▶ title
- ▶ short agenda
- ▶ date, time and location details – for auditing purposes, it should be noted when and where the meeting was held
- ▶ attendees list (and distribution – for stakeholders who did not attend, client, managers, etc)
- ▶ introduction and (if applicable) safety moment/toolbox talk/take-5 moment – introduce the attendees, their role, experience and their motivations in the meeting
- ▶ minutes of the meeting – the main content of the meeting is the structured notes, taken by a scribe or recorder. Each item discussed should be written with the name of the persons involved, keeping the focus of the work items on the relevant work parties
- ▶ AOB – any other business – items not on the agenda for the meeting but relevant and not specifically captured in the minutes thus far
- ▶ actions – tasks which the named participant should complete either generally, or before the start of the next meeting

Manage your documents

Go to the source

Finding information is a valuable skill: this goes for work and personal projects too. Over time, you gain some intuition of where information can likely be found. In the Google generation, finding information and a search engine mentality can help find data quicker. You know the kind of document you're looking for and where to look, or you know someone who knows someone. As you gain experience, the connections and interfaces between the different parts of a project/company becomes clearer.

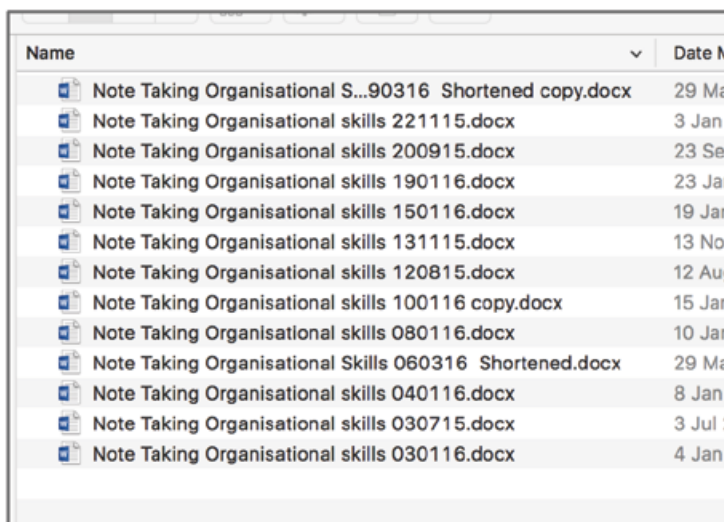
Stow it

Like people, companies and project teams have their preferences with respect to data storage and management. Where possible, obtain a copy of the document requirement schedule – a register of the different document types and how they are stored. Knowing how information is stored can help with finding the information when needed. Most document libraries or project document libraries are in electronic form and come with a Google-style search engine built into the user interface. However, knowing what to search for makes the most of search tools like this.

Likewise, knowing how information is stored helps you when creating and storing your own content. Accurate document revision numbering and date-stamping provide a clear and concise way to differentiate old and new versions of a document.

Example:

This list of files is a series of copies of one document. To create back-ups of the document, to allow reversion or to bring forward part of past versions, a new copy is saved each day. Work continues from the most recent version as it progresses. This serves to back up the document so any file corruption or technical issues only affect the most recent revision, leaving most of the work preserved, so work can continue again.



Name	Date Modified
Note Taking Organisational S...90316 Shortened copy.docx	29 Mar 2016
Note Taking Organisational skills 221115.docx	3 Jan 2016
Note Taking Organisational skills 200915.docx	23 Sep 2015
Note Taking Organisational skills 190116.docx	23 Jan 2016
Note Taking Organisational skills 150116.docx	19 Jan 2016
Note Taking Organisational skills 131115.docx	13 Nov 2015
Note Taking Organisational skills 120815.docx	12 Aug 2015
Note Taking Organisational skills 100116 copy.docx	15 Jan 2016
Note Taking Organisational skills 080116.docx	10 Jan 2016
Note Taking Organisational Skills 060316 Shortened.docx	29 Mar 2016
Note Taking Organisational skills 040116.docx	8 Jan 2016
Note Taking Organisational skills 030715.docx	3 Jul 2015
Note Taking Organisational skills 030116.docx	4 Jan 2016

Fig. 6 – Showing the contents of a 'superseded' folder. Highlighting previous revisions of a document as back-ups for the work. Note also the use of a date written into the document title to show the date of that copy.



When there are many documents with similar names, such as these above, a 'superseded' folder helps sort active documents from older versions. This saves both time (looking for the most recent revision) and mistakes (updating an older revision by mistake). This is particularly important when deleting older versions is not an option. If this is the case, you could go further and create an 'old versions' or 'superseded' folder.

Pass notes

Development of project deliverables and project documents (process and instrumentation diagrams (P&IDs), cause and effect diagrams, datasheets, etc.) traditionally involved a few disciplines who would all review and sign off before passing the documents to the client. The documents would then be approved and passed on to the fabrication and construction contractor to build the design.

Generally, in the process of creating a document, there are a series of 'passes' where the document would receive comments from other discipline engineers or the client and revisions would be made. These revisions involve changes to the technical drawing and the engineers would speak to a draughtsman, who has experience with developing engineering drawings, face-to-face who would copy up the drawing with the changes incorporated.

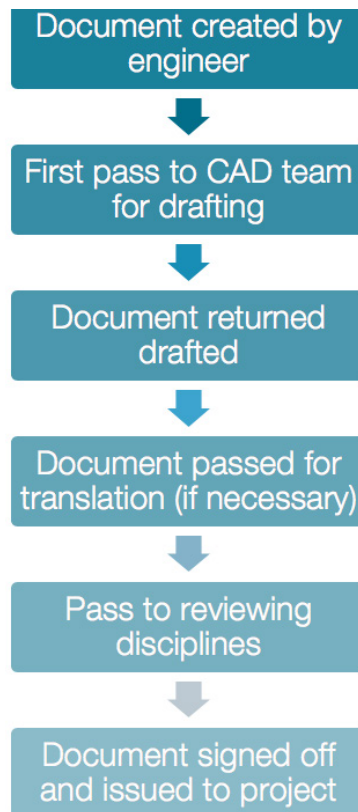


Fig. 7 – Flowchart demonstrating the draft and review process for developing and issuing project documents.

Document created by engineer – this may be a P&ID, a PFD, a layout drawing, etc. The document starts on a blank drawing package file or blank sheets of paper if particularly difficult to draw using a design package. The engineer creates the designs according to the standards of the client company, the local country regulations, the standards of the contractor company, industry best practices and engineering judgement. Usually a document storage hierarchy is observed and regulatory and client standards supersede others, but engineering judgement is essential to arrive at reasonable solutions.

First pass to drafting – to develop a draft document up to the company/project standard, it is passed to the drafting team who take the hand-drawn mark-ups and electronic mark-ups and draw them with a drawing package.

Return from drafting – the document is returned from the drafting house to the engineering team for review before it is developed further. The 'check-print' process is used to ensure the changes are implemented as the engineer intended.

Pass for discipline review – once the originator of the document is satisfied with the document, there is a 'squad check' – an internal review within the originating team. The document is then passed to other reviewing disciplines, if necessary, to ensure

that there are no conflicts with their priorities. Here an appreciation of the different drivers of different discipline teams helps develop an integrated, holistic solution to a problem.

Sign-off and issue – once all the stakeholders are agreed on the content, an electronic or hard copy of the document is passed around and signed off whether using digital signatures in software tools or using real signatures on paper. Some clients and project countries have a different approach to sign off on a document, such as using digital signatures as an alternative to printing.

Name your documents

Providing an unambiguous name to the electronic documents you work on is great to avoid confusion and wasted effort. This is certainly the case when passing documents over to other disciplines and drafting teams for development. In addition, use the techniques mentioned in the *Email* and *calendar tools* section to ensure that the emails are labelled so they can easily be found when needed.

Mark your documents clearly. Sometimes it is easier to print your documents and mark them up in the traditional way using marker pens and biro pens. Other times, using Adobe PDF tools to mark them up is used as a means to reduce printing and ink costs.

In some cases, especially where many global project offices will contribute to a design, a document may be marked up by hand and then scanned in for distribution to stakeholders.

Whatever the means, the following colour coding system is employed to differentiate between the different kinds of markings made on project documents.

RED – addition to the drawing.

BLUE – deletion from the drawing.

GREEN – a note to the draftsman on the way changes should be made.



Check your work

Check please

Keep control of your master documents when moving through the draft and review process. Label them properly for audit and legal reasons, using clear and intuitive titles. Ensure the date is marked on the hard copy archive version of the documents. All project deliverables are held on retention for a period of years. All drawings, reports and technical notes are stored for a period of years and are re-reviewed periodically over the life of a facility and each time a design change or modification takes place. These documents are stamped with a red MASTER stamp. This provides a clear mark on the hard copies. Each new revision of the master document requires that old masters are struck through. Bring the new masters to the top of the folder.

During the drafting process, the temporary, in-progress copy of the drawing may pass between the engineers and the drafting team several times. These copies are stamped with 'CHECK PRINT', or equivalent text between drafting phases to show it is an intermediate version of the design. As with master copies, the check prints are voided upon receipt of the new copy with the new changes incorporated.

Finally, the draft copy is placed side-by-side with the finished copy while a check is conducted to ensure the changes are incorporated as intended.

To demonstrate that the checks are incorporated, a yellow marker is used to strike through each of the drafting changes made in red, blue and green pen. These yellow marks confirm that the changes have been made.

N.B. In a modern drafting office, design changes and mark-ups are done on PDF files, and on the screen, in virtual files. This is much more efficient and less ambiguous than inconsistent mark-ups which can vary between engineers, each with their own style.

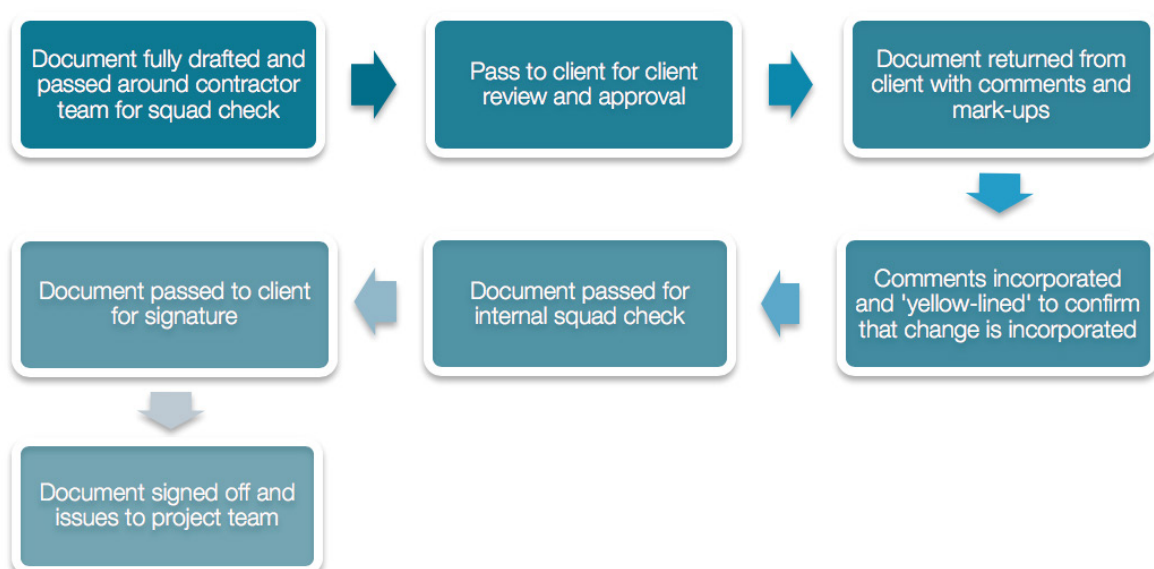


Fig. 8 – Flowchart demonstrating the Comment and Review process for developing and issuing project documents.

Generally, the check and approve process is the same and does not vary much from company to company. Central to the technique is the stage-wise approval, with sign off at each level (whether e-signature or 'wet' signature on paper) from the originator of the document to the checker and on, to the client approver. Documents may require approval signatures from other personnel within the company. For example, a document may require your manager's approval, but this document will then transfer to project management, electrical, mechanical department, piping team, etc. for their approval.

However, different companies have their own check and approval processes, so check which one you are working with. Ensure you know the difference between check and approval stages.

For example, checking is making sure that a document is technically correct.

Approval is ensuring that the checks are sufficient to enable approval and release of the document to the client or to a supplier, or customer.

Auditing matters

Carefully organised files and hard-copy documents help a team to execute their deliverables easily because the team knows where everything is stored. This organisation serves another more rigorous purpose when it comes to auditing as the project team and company can demonstrate exactly the basis for a design, and the due diligence to develop that design toward fabrication and construction.

For a company and a project to adhere to international standards for transparency and assurance, a strong chain of development should be in place.

The audit is not an action which you can expect to be involved with. An auditor is met by senior personnel who can walk the auditor through the key parts of the project before reviewing the details. You may be asked to support this activity by preparing documents to show an auditor. Understanding document handling requirements and acting accordingly enables a smooth audit. A good preparation activity usually flags any issues ahead of an audit, allowing them to be rectified or managed rather than being highlighted during an auditing process.

With engineering disciplines, much of the work is completed on computers, and there is a need to understand how documents are stored according to a project document register. The documents need to be stored throughout the project lifecycle, from the concept stage, to the construction phase, to operations phase and then to the management of change and decommissioning.

A risk assessment report such as a HAZOP report, may be required to be held on paper file for up to five years because of the need to complete a re-HAZOP. This is a follow-up risk analysis of the as-built facility to verify the risk profile of the facility. This

review can also incorporate any design changes, debottlenecking modifications or upgrades which may have happened since initial construction and commissioning. With design documents like P&IDs, hard copies are present on site, as are isometric drawings detailing the exact dimensions of the pipework and relative positions of valves, units and lines.

Retention times for key documents surrounding risk and due diligence, including contracts, may be held on retention for up to 40 years. For many projects, this is beyond the initial typical 25 to 30 year design life of a hydrocarbon processing facility.

Send data securely

When a document is sent electronically to colleagues overseas or a workshare office, use encryption to ensure that the document arrives safely. Modern efforts to compromise data security for engineering design offices are becoming more sophisticated. They go beyond basic efforts to phish for access passwords and sensitive personal information. They include 'packet-sniffing', analysing the stream of data leaving the servers of the company and entering the wider domain of the internet. To ensure that your data is not intercepted and to preserve the client confidentiality as per the Data Protection Act 2018, the following use of encryption packages, i.e. Microsoft WinZip.

To use an encryption software tool, zip the file up using 256-bit encryption and create a password for the encryption. Following this, you are ready to send the file:

- ▶ send the email with the encrypted files to the intended recipient
- ▶ send a separate email with the password for the encryption and confirm that they can access the packet
- ▶ act diligently for your client and protect their data



Good habits

There is a Chinese proverb which reads:

Thoughts become words
Words become actions
Actions repeated, harden into a habit
And habits are hard to break

So we must carefully watch our thoughts, words and deeds so that we foster good habits.

The same applies when working on an engineering project. It is crucial to develop a consistent quality of your work and delivery habits. This will support and regulate your professional development as you grow in your career. This will, in turn, open up opportunities for you to learn more and gain on-the-job development.

Unfortunately there is no set, standard way of checking a document. It is in some ways an art form which must be practised over time, applying judgement. The checking requirements vary between documents, dependant on the technical and commercial risk associated with the project. Projects which carry greater commercial risk or where technical details have a greater impact on the design, a closer inspection may be required.

This skill is not taught in universities. It is up to the individual to ensure they receive enough training and practice in the workplace, so they can improve over time.

To add a layer of complexity to this, different companies and individuals have different approaches to checking. Ask up front about the expectations for checking to ensure that you deliver what is required.

Stepping through your experience and early career from new graduate to seasoned professional takes time. Use this time to practise the following helpful skills and methods:

Weekly check

Check all the work you do. Engineering is a detail-focussed discipline. Evaluate the difficulties you have experienced and where you have made errors. Review where you did or could have asked for help. If you need help, then ask for it next time. There is no shame in asking for help, collaboration is an increasingly important skill in a modern workplace. If an individual continues to make the same mistakes repeatedly and does not learn from their mistakes during normal work, then this highlights a development opportunity. Structured actions can be taken to coach the individual on ways to self-train and improve, or they can work together with others to deliver something much greater than their efforts alone. Part of your graduate training should help you develop your checking and review skills. This will enable you to gradually minimise the number of basic errors you make.

At the same time, go easy on yourself and realise it's okay to make mistakes. We are all human and everyone makes mistakes. The crux of this technique seeks to reduce the number and severity of mistakes you make.

Making mistakes and being comfortable with admitting to them is a great way of learning and opens your mind to the lessons rather than closing yourself off from what happened. Remember, if you do a task each time and it all goes well, then what did you learn from the experience?

If you proceed through a task, you may simply have excellent ability, or be lucky in a specific instance. If you undertake a similar task, and make a minor change, you could be lucky again or, by repeating what you did last time, could generate an error because of the small change.

Seek feedback

It would be unrealistic to expect that newly-minted graduates could perform faultlessly straight out of university. While many workplaces demand excellence, they often couch these demands in expectations of some mistakes from new inexperienced personnel.

Remember: personal development = mistakes + learning.

Luckily, many graduate programmes and entry-level engineering roles embrace the need for learning. Managers are flexible with time and offer a supportive environment to graduates.

Leverage this unique opportunity and openly and regularly seek feedback from your peers, supervisors and managers. This tool is particularly useful if you undergo an extended set of exercises or something you haven't done before i.e. present to the engineering management team, develop a set of Standard Operating Procedures, etc.

Set goals

By setting goals, you direct your performance toward a more consistent, fulfilling journey and greater professional standards in your work. This is the same philosophy applied in the 'one percent better' programmes, popular in self-improvement/self-development courses. Focus on doing that tiny bit better at your job each day. Over time, you will have developed your performance and moved toward your goals.

Combine your goal setting time with your weekly review and your calendar tools in the section above. You will be aware of what you are doing at all times as you step toward your goals.

Best practice

Best practice in engineering can be defined as a method that is generally accepted as superior to other alternatives because the results from it are better than those arrived at by other means. Often these 'better ways' become the standard way of doing things in an engineering context because they enable simpler, safer and more cost-effective designs which comply with standards and with legal and operational requirements.

Sometimes best practices come around in a natural way from organic learning - exploring a design process and discovering what works best. Others are a result of responding to market conditions or sudden changes in regulation which make previous methods and designs untenable.

During the Oil Price Crisis of 2014, there was a significant drop in oil price from \$100 per barrel to around \$30 per barrel. This instantly pressed on the feasibility of oil extraction and production company operations. There was a resulting push by oil companies and engineering houses to streamline and simplify designs. In many cases, highly customised and complex upstream projects were shelved because the economics simply didn't stack up in the new "lower-for-longer" oil price context. In others, major redesign using 'value engineering' techniques to explore cheaper methods were taken forward.

An example of best practice which grew significantly during this time was the sub-sea tie-back. Tie-backs are a cheaper and more flexible way to exploit oil deposits by "tying back" a newly drilled well to an existing oil and gas infrastructure (be it a platform, an FPSO, pipeline, etc.). By running pipelines from a standardised, cheap-to-build well-head and joining into an existing gathering network, the operating oil company can add more production for much less investment. This enables them to cut the cost of new projects by an order of magnitude through avoiding the need for new platforms and stand-alone infrastructure.

When taken together with the resulting lower HSSE risks, shorter time from concept to construction, and the lower bar for project feasibility, tie-backs became a best practice for oilfield exploitation.

This was a fundamental change in the way that upstream projects were executed and it demanded a step-change in the design approach of engineers. This challenged them to become more open-minded and curious about how to improve their designs. Bear this in mind as you go through your early career and observe the step-changes and incremental changes which shape the way you work. Note that best practices have a time and place and a best practice from 30 years ago will not necessarily be a best practice today.

When the above step-change in market conditions happens, sudden innovation takes hold as a necessity. However, even during more stable times, there are often other smaller optimisations which can be explored. This is achieved through constant attention to processes, and the efficiencies which can be eked out of existing systems.

Continuous improvement is the ongoing effort to improve the value of products and services by incremental improvement (as with year-on-year development, crafting and refinement of Formula 1 race cars). To follow the example of the increased oil production above, well stimulation, debottlenecking of production facilities, and use of reinjection facilities to maintain reservoir pressure, thus forcing more oil to become extracted from the deposit.

There is a whole zoo of tools and approaches however a common technique is the PDCA cycle which stands for:

- ▶ Plan
- ▶ Do
- ▶ Check
- ▶ Act

These are the steps we can take to plan our work, and to integrate checking and review stages after doing it. By reviewing the outcomes of our work and the ways in which we arrived at those outcomes, we can develop more effective working techniques and methods. By this, you are able and empowered to establish your own best practices as you create the future of engineering.

Build a library

Engineering is a field full of assumptions, lessons from history and opportunities to apply your experience. Support your development and create a reference library for useful design manuals, standards and technical documents.

Build a store of not just ebooks, design and regulatory standards but also calculation methods and software tools. Often you will create standard time-saving calculation excel sheets. Using a calculation tool and keeping it saves the value for years down the line. Similarly, reference documents retain insights gained on previous projects. Cross-pollination of ideas from one scenario to another is a key ingredient to progression and innovative design. Create your own library and use the material to help support this development.

Often individuals can develop a time-saving calculation tool which they do not share with the wider community, their company or their team. In this case, they save time themselves but others do not, or others have to develop their own tool and recreate the calculation.

Why not share your calculation, how you developed it, and the capabilities of your tool in a lunch and learn with your team?

It should be noted that in the interests of integrity and transparency, all such tools should be checked and approved for use by a suitably qualified individual so that any errors are caught.



Create a reliable reference system as follows:

- ▶ gather electronic copies of documents and ebooks of core reading for your discipline
- ▶ index each book in your library in a spreadsheet containing each item against a reference number and associated keywords related to that book
- ▶ this way, you have a good searchable source for any information you may need in a given moment
- ▶ continue to add and read the documents

Sources

Industry journals from IChemE, IMechE, JPT, etc. depending on the flavour of engineering you pursue, are a great source of free materials to their members. IChemE publish a series of journals covering a wide range of subject areas, including Chemical Engineering Research and Design, Sustainable Production and Consumption, and Process Safety and Environmental Design. These journals are published in partnership with Elsevier scientific publisher.



Fig. 9 – A selection of fine IChemE Journals, published in partnership with scientific publisher Elsevier to support your learning and continuous professional development.

There are many free websites with lessons learned from industrial incidents. There are also soft copies of industry standards to read the key details. IChemE also organises some excellent webinars from industry-renowned subject matter experts which are well worth dialling into. These are useful to help you understand the high-level design philosophies that you encounter, which is crucial when specifying equipment as a design engineer. Typical regulations you will encounter are a mix of specific, prescriptive design standards and occupational health standards. You can subscribe and download newsletters and incident reports, etc. from bodies, including:

- ▶ American Petroleum Institute (API)
- ▶ Occupational Safety and Health Administration (OSHA), USA
- ▶ Health and Safety Executive (HSE), UK
- ▶ International Association of Oil & Gas producers (OGP)
- ▶ European Industrial Gases Association (EIGA)

Take time to read and understand the design standards which govern the work you do. They offer insight into why a unit or process is designed in a certain way. By making effort to understand the prescriptive or progressive design standards through independent study and the equations which govern the system through formal tuition and study in education, you can unify and make a better judgment on the outcomes of design software packages. This makes for a more rigorous approach to design.

Studying design standards is an excellent way of capturing knowledge and it is even more so when you ask questions to experienced team mates.

If you do not understand a design guide or standard, ask the author or a more senior engineer why the guide states what it does. The chances are that the design standard is correct and that it is the individual who has misinterpreted the guide.

This is a subtle and important point in an age where people sat in offices in many nations may be contributing to the same engineering design project.

Consider this typical scenario: where you may be sat in the UK and all the project documentation is in English, and you may not understand the sense of the design manual, consider the impact on colleagues who have English as a second, third or even fourth language. It is of ultimate importance to be clear in this operating environment.

Regulate and empower your learning: applying knowledge to a project cements ideas in your mind.

Learn through independent study and apply it to an example project. You can then do a lunch and learn on the subject you have researched and present that to your peers.



This provides two benefits:

- you learn something and expand your sphere of experience and practise your presentation and communication skills, which is a key aspect of CPD (Continuous Professional Development) records
- your colleagues learn something too. By encouraging them to do the same, you are taking active steps to foster a proactive development culture

You can also use hardback books as reference reading. Local libraries can access these from the British Library at a cost of a few pounds only. Using these, you can develop your understanding further. This is a good alternative to spending a lot to buy the books for yourself.

A proactive attitude

Often enriching professional experience can be obtained through non-standard and unusual situations. When something 'strange' or out-of-the-ordinary happens, there is a learning opportunity and a new way of doing and seeing things. Being exposed to such situations can be a case of luck. However, when you take a proactive approach and engage those around you to get involved in different activities and projects, the odds start to move in your favour.

Some examples include: attend managerial meetings – understand each department and their priorities and what drives their arguments.

Same meeting, different roles

Development goals laid out by professional bodies often cite a need for experience in different types of roles to see the same kind of problem from different perspectives. This emphasises the need for the broad, and multi-sided perspective of modern engineers. This may include working as a scribe at a HAZOP meeting, being a safety engineering representative at a meeting and being a chairperson at a meeting.



Each role leans on different skills when you work in a group. A well-rounded professional should have some understanding and practical experience when working in each one.

For example:

Scribe – listening skills, quick typing, understanding of a wide technical vocabulary, an understanding of processes and engineering, assertiveness – to ask for clarification, pragmatism – overcoming IT difficulties, etc.

Safety engineer representative – understanding of process safety principles, good communication skills, good analytical skills, experience.

Chair-person – skilled at engaging others to seek opinions, experienced with facilitating group meetings, experienced in safety engineering.

Collating documents

As mentioned earlier, meeting minutes are a great way to formally capture the outcomes of a meeting. Minutes and progress from previous meetings can be used to drive the discussions of the current meeting. This is often the case in regular weekly meetings where the actions from the previous week are answered with a status update.

The scribe will follow up with non-attendees to seek their status update on their action items and incorporate those comments into the body of the report or new meeting minutes.

Report writing

The skill of seamless integration of different writing styles is a handy skill when preparing a report, with contributions of different sections from different people. In this example, there is engagement from many different interested parties: regulatory authorities, clients and contractors.

Bringing all these parts together into one coherent argument which all people can understand and which reads well, is difficult. Taking time to understand the situation and to link all the pieces together helps you when preparing one long report, for example, a HAZOP report or risk assessment for a large industrial site. Many people will work to prepare the different components of the report. As a graduate or new engineer, it is easy to contribute to such reports in minor ways. And often, drafting the pieces from different people will be your job. Because of the exposure to experienced personnel and a need to understand, you will learn a lot in a short period of time after doing this.

Recent graduates may find that they join an engineering firm, and start to write reports in an academic style. This is a logical progression and it follows on from what has been taught to them from university. However, in industry, the requirements for report writing are very different. It may take time to understand and change writing styles to align with this. Ask questions to your supervisor about requirements and take time to read existing reports to gain a better insight into the similarities and differences in priorities between the two.



Create solutions

The contemporary engineering company or energy supermajor places a lot of value on its graduates being able to adapt and develop systems to overcome inefficiencies and legacy issues in the company.

Place yourself in the driving seat and develop a robust set of skills for the digital workplace. The training and actual learning of these skills is beyond the scope of this guide to the engineering industry. Take this as a list of future-proof skills which will enable you to stay relevant in an increasingly digitalised and globalised world.

However, tread carefully with increased automation. Consider the adage “garbage in, garbage out” when it comes to automation, formulae and simulations.

Some inexperienced engineers have a tendency to input the numbers required into the Excel or a software package simulation of a process and then automatically assume the generated solutions and answers are correct.

This is a fundamentally flawed approach to process design which carries high risk. Make efforts to stay alert to avoid this.

A good practice borrowed from diverse parts of the industry is to follow through a proposed calculation using the design guides and standards, to follow through the methodology and to fully understand the detail by hand. The next step is to validate the calculations by putting them into the excel or software package. This way, your engineering judgement is enriched as you start to gain a feel for how the calculations work.

Industry Insight:

I myself designed fire water, fire fighting foam systems and fire and gas detection systems using NFPA standards to understand the basis of design and to guide the design to an appropriate solution.

Coding skills

While developing a whole new software package or a design tool may be beyond your scope, it is increasingly important for graduates to be digital literate. This follows a progression beyond the normal STEM literacy and general literacy which was supported by the various governments in recent decades.

An example may be automation of a monthly reporting cycle from Microsoft Excel. In this example, Macros and simple Excel Visual Basic can be used to:

- ▶ automate the calculations and populating a data table with values
- ▶ apply filters to a set of data

- ▶ return a series of calculated outputs from a set of refreshed data
- ▶ generate updated charts
- ▶ copy and paste from one sheet to another
- ▶ reduce the amount of time spent on reporting activities
- ▶ improve the standard of the reporting

Assigned to macro-enabled buttons, macros and automated actions are a powerful tool. This reduces the amount of time spent on administration and clerical work, enabling more interesting work to be taken up.

N.B. The genius of modern Microsoft Excel is the 'Record Macros' button. This enables all users to record macros and 'chop-and-change' the content with the VBA editor until it does the intended task correctly.

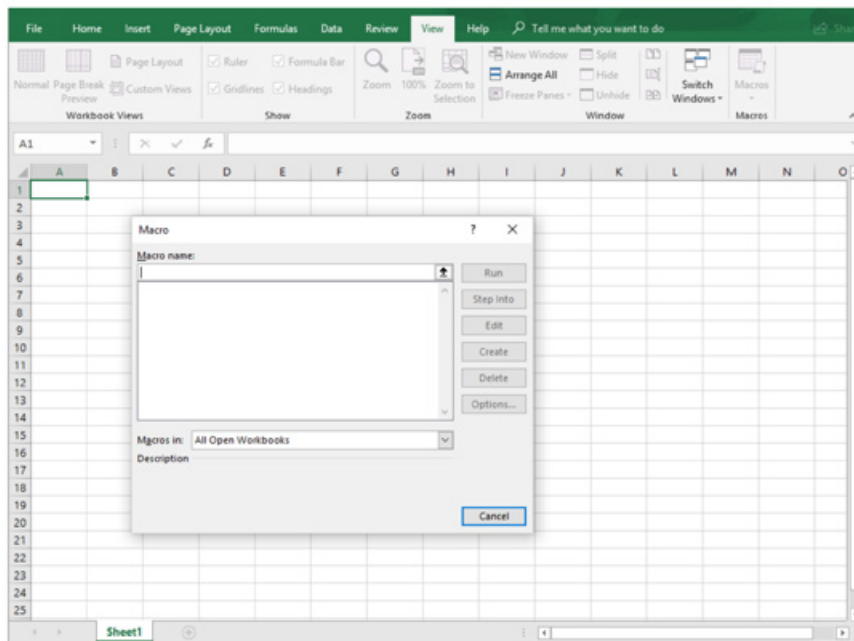


Fig. 10– Macro development tool in Excel, a start to using the VBA tool to develop automated workbooks, regulating quality and reducing time required on reporting.

With experience, Excel skills are vital to diagnose problems and errors when compiling data.

Another good application of coding and Excel skills are to develop your own calculations packages and automated calculation spreadsheets. These are commonly used and developed by senior engineers as a time saver. Once the basis and the assumptions of the calculations have been proven and validated, these rudimentary 'models' can be used again and again on other projects.

This is possible, provided that the models are also checked to ensure that no errors are carried forward from one set of calculations to another.

ACTIVITY

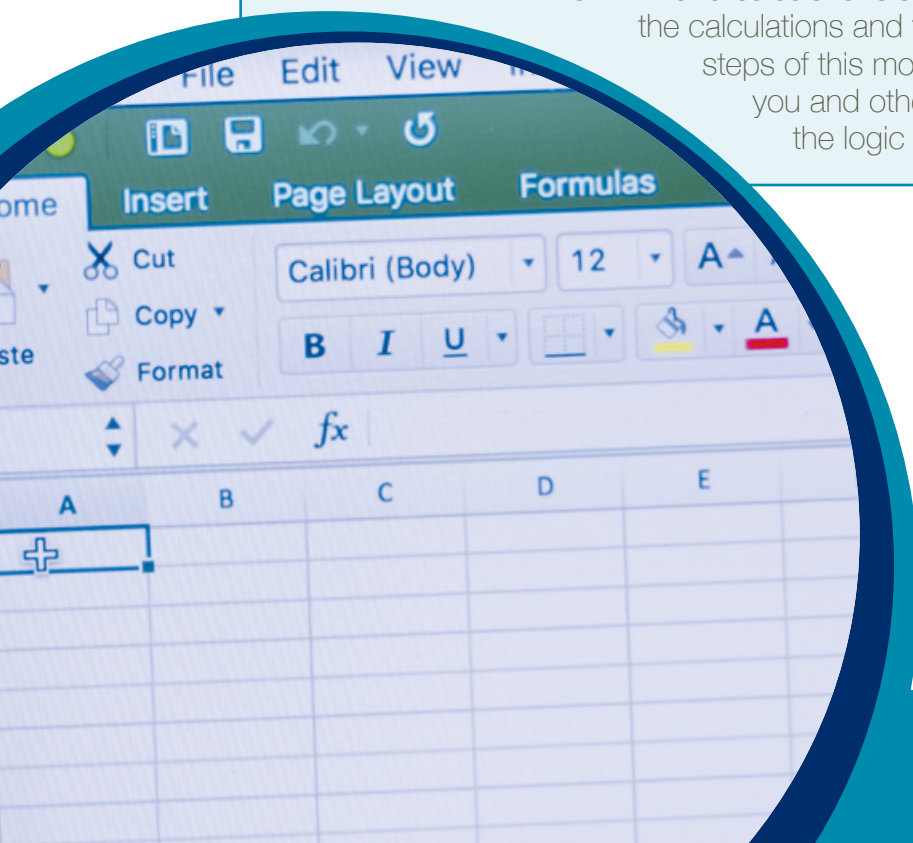
Think of the common and regular calculations and reporting tasks that you complete on a regular basis, especially if you're using Excel. Try to break them down into simple steps.

Then, using Excel, and the 'record macro' button, record all the steps of the action you want to complete. Once assigned to a macro button, this macro can be run and automate all the steps you previously completed manually.

Bonus Tip: This automated reporting is powerful when linked to a slide pack with an embedded Excel chart. When the update macro is run, the linked PowerPoint chart will automatically update.

Often graduates and experienced personnel alike can develop very large calculations in spreadsheets in an organic fashion. Like weeds, they grow and grow, becoming more difficult to inspect and follow the flow of information from cell to cell. This is compounded when many functions are entered within one formula in a cell.

As with hand calculations and paper models, try to break down the calculations and the formulae and then number the steps of this more simple calculation. This can save you and others time by making it easier to follow the logic in a simple manner.



Manage expectations

Manage your manager

Your manager has expectations of you: a certain quality in your work commensurate with your experience and qualifications, an expectation of your ability to meet deadlines. A good, even-handed manager will understand how to balance workflow across the members of a team and will make it clear when the whole team/department will be stretched due to peaks and troughs in demand. They may speak frankly and explain that “this is the case” or “that’s the situation we find ourselves in, and we need to pull together to make it work”.

Look out for managers or project engineers who consistently push unrealistic schedules or a very demanding workflow in your direction. This is a sign of poor management on their part. Do not let their demands reflect into a panic situation for you.

Here are some techniques you can use to bring the bargaining power into your hands and to give yourself a steadier work day. Try them early in your career and give yourself time to practise them. Evaluate which ones work for you and see their positive effect on your day-to-day work life:

Deadlines are your friend

When a piece of work arrives at your desk, it may be marked as ‘urgent’ or for ‘whenever you can’, or ASAP. When you receive any work, always request a deadline to accompany it. Even a rough deadline is more useful than no limit. This pushes the responsibility for the delivery timescale back onto those who send the work. It forces them to recognise and consider the relative importance of the work they are asking for. This way, you take control of your work and can place it into a work schedule for your benefit. It will also benefit future workload discussions, as you gain an accurate picture of your workload, making it easier to accept or decline any additional work.

Cut loose

Balance your workflow by highlighting to your manager that their needs and demands of you are greater than the time you have available. Advise that you need their support to decide which piece of work to deprioritise. This technique works well each time an extra task is added to your standard workload, or if a last-minute item arrives and you are assigned to it.

- ▶ approach your supervisor with your current workload
- ▶ tell them about the new work added to your activity list

- ▶ ask them which piece of work they want to push to lower priority/conversely which have the highest priority
- ▶ often times you'll receive an updated, more realistic workflow and you now have more breathing space to deliver well on your work

N.B. It is better to engage your line manager earlier about any challenges in time management. This helps you to not disappoint by being late, and it helps your manager deliver because any crucial items can be reallocated to another less-busy team member. Remember, managing the workflow for the team is your manager's job – make them do their job when you feel under too much pressure. Be open and honest about how you feel about this.

Booking time for you

The simple act of booking time in your calendar for yourself can make a great impact on the progress of your development.

Because development activities, while useful for you, are not in themselves deliverable, this can lead to them being left until Friday afternoon. Then something occurs which prevents the personal development work from being done.

The same can apply to longer term development type tasks. Because these intentions and goals can take years to achieve (attaining Chartered status for example), they can slip off the radar, especially if there is a 'busy period' of significant time demands. Sadly it does not take much to knock personal development habits.

Take the responsibility to schedule regular spots in your calendar and permit yourself to commit fully to taking positive action on the development actions you set for yourself.

Extra time

When you are given a new piece of work, you may be asked: "how long you think you will take to complete this?". This is your opportunity to build some breathing space into that activity and take the pressure off yourself. Remember, the aim is to deliver quality work in an unhurried way and in a positive stress-management way. Using your experience with doing similar work, you can gauge for yourself how long you think the task will take. Consider upcoming meetings and tasks in your inbox against the time already committed when offering an estimated completion time to your manager. Consider adding more time to your estimate as a contingency. Used sparingly and reasonably, i.e. when work will need to be reviewed and a second draft completed, this technique can help you manage workplace stress from an excessive workload.

N.B. There are many times that an engineer will assume a job will take a specific, fixed length of time to complete. This leads them to only starting work when they have that amount of time left before the deadline. If there are any uncertainties, anything requiring feedback or changing, or clarification of the facts, then this can easily lengthen the project and lead to missing the deadline.

Ace in the hole

Reporting your progress seems a straight-forward task. Simply tell your supervisor where you are on the work assigned to you. However, you can use this opportunity to promote your efforts and your time management skills in a positive way. This can benefit you well when it comes to performance review time, or when you seek a pay rise.

Maximise the benefit of your efforts to clear your desk and be proactive to ask and get involved in work which you want to be involved in.

Manage yourself

University comes with a fair degree of structure and timetables for lectures and provides time for self-study. Work in engineering design offices is somewhat different. Outside of your project work, attention and adherence to graduate schemes and graduate development can be a somewhat lower priority than you may have been led to believe.

During your first steps in your engineering career, take time to learn your value, alongside gaining valuable experience and serving your own (personal development) intents. There are some companies which do provide top-quality graduate training accredited by IChemE. However, some graduate schemes are simply poorly defined. This makes it difficult for aspiring junior engineers to align with the development aims laid-down by their professional body. Beware of these schemes and steer clear – if unsure, speak to engineers and junior personnel working at the firm. This will help you get a frank and honest review of the work, the company culture and the attitude toward graduate development.

Take action against neglect and uncertainty and manage your own graduate development as mentioned earlier in this book. The goal of attaining Chartered status is a long-term goal. It requires a degree of patience and dedication to meet it. Develop a suite of genuinely useful tools for use outside of the office to drive and support your efforts in the office. This way, you maximise the value of the time you have as a junior engineer.

This section is dedicated to providing ideas and tools to help you accomplish these aims.

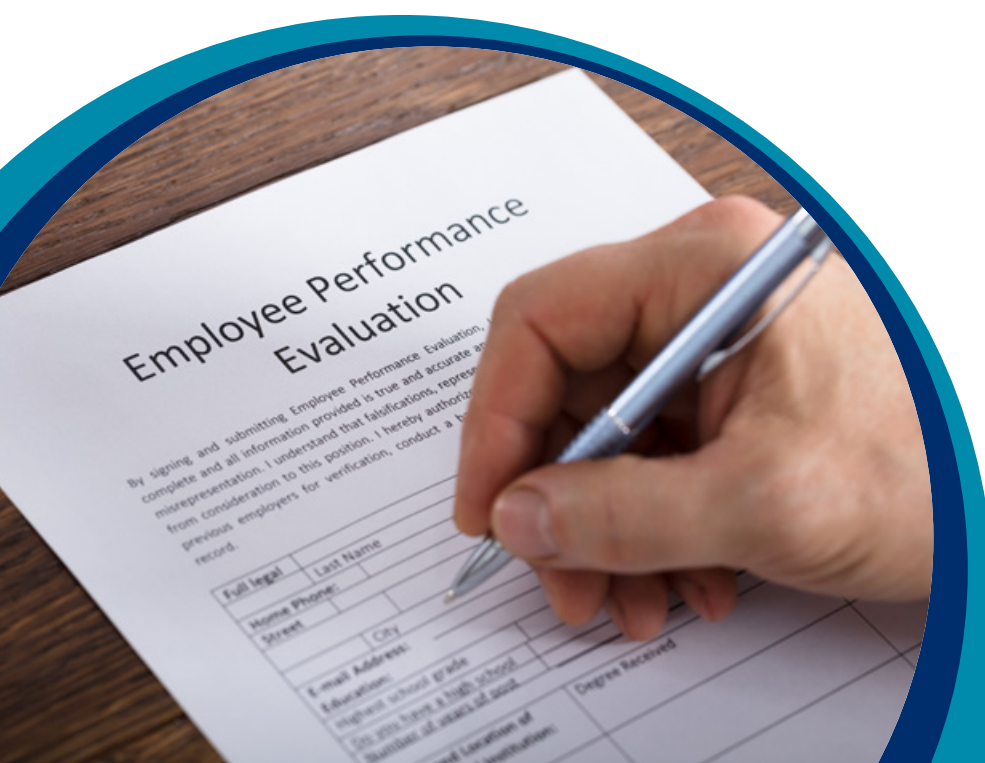


Appraisals

Appraisals and performance reviews encompass the twin benefits of looking back over the last six months or so, and looking ahead to the next six months to plan your development goals. Use your appraisal, the lead-up time and your day-to-day work wisely so that you gain maximum skill building and maximum achievement for as little time and effort as possible. Use the time during an appraisal to your advantage and extract the maximum value you can from a frank discussion with your line manager about where you both feel you are, and where you want to go. However, a good manager should endeavour to keep a good dialogue with you throughout the year so that there are no surprises about your performance later in the year.

SMART Key Performance Indicators (KPIs)

SMART KPIs are a must-have tool for many organisations in the modern labour market. Depending on the organisation, they can be used for different things. SMART is a mnemonic and it is a guide to inspiring progress between appraisal reviews by constraining your goals into targets which you can drive towards in a realistic and achievable way. Ideally, these KPIs should empower you and inspire you to meet a stretching target. In difficult economic times, however, these KPIs can also be used as the gate you need to squeeze through to gain a pay raise or promotion. Don't let a reviewing manager hold back your ambitions for a more challenging activity, a new role, or a greater salary. Use SMART KPIs and build a solid case for what you want. And be clear to ask what you want: assertive attitudes are crucial to getting the results you want.



- Specific** Keep your Performance Indicators limited to a specific action or aim. This draws focus and effort towards one goal, and in doing so, a lofty goal is converted into small and clear actions which can be easily completed.
- Measurable** Your goals must be 'measurable': it should be clear whether you have met your target, or indeed how close you came to achieve it. This is especially important when persuading line managers about your petition for a promotion or a pay rise.
- Attainable** The indicator should be something that can be achieved. Is it something you can achieve in your current role or do you need some help or extra opportunities to help get you there?
- Realistic** The goals you create should be realistic – something you can reasonably achieve in the period following this review.
- Time-based** As with the other SMART acronym letters, apply boundaries to your goal to bring it under your control. Time should be a factor in your KPI setting (i.e. within three months, within six months, etc.).

Additional support and appraisal referees

Feedback from your supervisor during the period you have completed is very useful. Try to gather feedback from all your colleagues or anyone you work with on a regular basis – the close working will give them a good idea of who you are and how you can work together.

Reference to market conditions and the sector in question: in recent years, the hydrocarbons and minerals, mining and metals sectors have all entered a slump in the business cycle. Accordingly, there is little wiggle room for managers to provide pay rises in their budgets when those same budgets are strained in light of cuts and reductions of the workforce.

Sometimes it feels like butting against a brick wall when seeking pay rises. Do not lose heart if this happens. Do not take it personally either; look wider than your current situation. Do the other juniors and staff sit in the same predicament? Does the industry have problems which may impact your situation? Is the outlook uncertain for your sector?

Backing-up your claims is a good habit to develop ahead of asking for a promotion, or a pay rise. Establishing a clear and persuasive case is a powerful support tool. Keep this in mind as you go forward. This may seem a lack of structure in your role and the appraisal system. You can take action to avoid drifting during your career with no targets or goals. Shift the equation and start to review the lack of restrictions in your career as an opportunity for you to apply yourself and craft your career.

Craft your career

Taking a proactive stance on your career development is the most important task you can set yourself. Work on yourself to gain maximum value from the time you spend at work. Everything else comes as a secondary consideration relative to the goals and your vision for your career. Set your sights on your ultimate aim - where you want to go, what you want to achieve, and the types of work you want to do. Then set your goals and the kinds of development areas you need, leading up to your 'ultimate' job.

As you complete the early steps in your graduate career, be it in law, chemical engineering, commercial, etc. there are some key questions you will need to answer along the way.

This section covers the insightful questions to ask in order to guide yourself closer to your ideal and most satisfying work life and career.

Ability-based questions

Essentially: are you technically competent enough to do this?

This question you should ask yourself when looking at any goals or upcoming tasks you want to achieve. Look at what the challenge seeks from you, and consider which areas you are stronger in, and those which are not so strong for you.

When you spot a skills gap or a deficiency, reframe this as an area for development. Embrace the mentally-reinforcing aspect of reframing things to see it as a chance to stir things up, and to learn something new or revisit something to become stronger.

This is a pragmatic step which is crucial to continue developing your skills and embracing continuous professional development.

Philosophy-based questions

Is this area the right fit for you?

This question leans not on technical skill, or on your transferable skills but rather on your emotional intelligence. Emotional intelligence is a crucial skill in any workplace and it can be learned. The intent of this question is to ask:

- ▶ do you like what you are doing?
- ▶ is this aligned with your values and beliefs?
- ▶ does it align with your strongest skills and abilities?

By opening up about what you're good at, and speaking more from the heart, you can see if you are a right fit for the firm. And you can see if you're trying to fit yourself

into a spot which doesn't fit you. This can help you immensely in unsticking you from a rut and prevent you from committing more time than necessary to a job which simply does not nourish you.

Some typical examples of insight questions you may have been asked previously include:

Why do you want to be a (insert your chosen field here)?

In this question, you need to draw on solid experiences which guided you toward your chosen path. This could range from early youth experiences when you just knew you wanted to do X and Y activity and your chosen field supports those well.

It could also be from the capability side: you may have a strong aptitude for maths and physics so engineering or finance could be a natural field for your skills.

Remember some examples of where you have tried out in the field already. These are a great support to you and this could include time spent on industry days, insight days, vacation schemes, internships etc. All these could be with the firm or at other companies in the sector. Using (real) examples such as these shows the recruiter that you are a serious candidate and have organised yourself to gain some insight in the field.

Why do you want to work for (insert name of company)?

To give a rounded answer, you need to come at this question from some different angles, and the points you give must be relevant and meaningful.

It can help you to also share any industry trends or macroeconomic themes you have noticed, and your insights about the firm. For example, in the energy company you're applying to, have you seen a change in their producing asset portfolio? Is their divestment from oil and increased production of natural gas aligned with Paris accord and the CO₂ targets? Share this: lateral thinking and credible people are highly sought after. Show your genuine interest and see how far it takes you.

A strong Diversity and Inclusion policy is key to contemporary business. Look at your target firm and check their statistics. Check out what awards they have won from Stonewall and from FT diversity awards. Do they have stated aims and targets?

Remember that diversity enables everyone to learn from different perspectives and an inclusive environment enables each person to be themselves and deliver their best work as they feel accepted for who they are. Communicate words to this effect and show your understanding. Likewise, if you have personal stories, like experience in widening participation groups, then share those in this part.



Look back

As with any self-development action or continuous improvement mindset, it is important to follow through the four stages, this is:

Plan – plan what you will improve, set your goals and where you want to go, plan the actions you will take, and develop the strategy you will apply to get you there.

Do – complete the actions you have set out against the plan as best you can.

Check – review, evaluate and take time to understand where things went well for you against the plan, and also where things did not go well. Remember in any career, there is a long time to go. No one is perfect. If you do not pick up all the development actions on the first time around, do not worry. Keep them on the development list and seek help with them next time around.

Act – take the actions set out from the checking stage and put them into action. This will form the basis for your next cycle of development.

These steps will help you greatly with your intentions to craft your career toward a specific goal or position. And remember, because you are crafting your career, you are in control and may course-correct where you see fit. It is certainly worth putting the actions into your personal development plan.

Becoming Chartered: ideas and best practice

Applying to become a Chartered Chemical Engineer through the Institution of Chemical Engineers (IChemE) can seem a daunting challenge but it is a worthy and valuable one. It can seem like a long way off when starting the first role in your engineering career. However, even at this point, it helps to begin with the end in mind. Consider the steps you must take to reach the necessary level of experience, competency and professional development. I found that it pays greatly to get organised early on and carefully record your on-the-job development as you work instead of letting it pile up for later.

Step 1 – Consult the IChemE resources

The details of how to apply for Chartered membership and Chartered Engineer (CEng) registration are covered very well in the guides and application templates available on the IChemE website at www.icheme.org. Accordingly, I will not delve into the process of submitting an application to IChemE for Chartered membership.

These guides delineate what is expected to display your experience and competence effectively. Get familiar with these competencies as they become a useful frame of reference to look for opportunities for development and when you record your on-the-job learning. There are also example reports available to give the flavour of what is expected and how to communicate effectively in your report writing. Each section of the report challenges a particular aspect of your experience as an engineer. This ranges from technical and engineering skill, through to soft-skills and the way you manage your self-development. I've made some brief observations below from my experience with writing the report below. These sections include:

Section A: Evidence of applying your knowledge and understanding to practical situations.

This section is entirely focused on the input you made to practical engineering work and how you have demonstrated your technical skills. You can start filling this section by planning your on-the-job personal development and seeking support from your manager and team-mates about opportunities to fill any outstanding gaps you find.

Section B: Evidence that you are able to handle the wider implications of your work as an engineer.

Here you are asked to demonstrate that you have adequately handled the health, hazard and safety aspects of engineering by applying principles, good practice, and meeting legislative requirements. It also asks for situations which showcase your ability to handle commercial aspects of engineering. This is not strictly technical work but it is crucial to the life of a project. After all, the best design in the world cannot be built if the project economics are not fit for purpose too. Similarly, if the project does not meet legislative requirements, the local country will not grant the necessary permits for construction and operation.

Section C: Evidence of your interpersonal, leadership and communication skills.

Here you are requested to describe times when you managed interpersonal relationships, demonstrated leadership in a professional role, and communicated ideas and plans by report writing and oral presentation. This can be covered by your presentation at conferences, or by presenting your work during negotiations with your customers.

Be aware that leadership, in this context, does not mean that you need to have a formal 'leadership' role. Rather it means that in your work, you must espouse the virtues and actions of a leader and write examples which show this. In this way, leadership means having:

- ▶ vision: having a clear view of the kind of outcomes you want
- ▶ proactivity: taking action to build a case and creating "show me, tell me" examples to bring your team-mates and managers on-board, helping them to see your vision. It also means taking the first step to show how you believe your solution is possible and credible
- ▶ teamwork: driving a team, by assigning workflow, persuading others to help (and helping others) with your enthusiasm, dedication, and shared vision

There are other sections D and E related to acting with high standards of professional and ethical conduct, and sharing your record of continuing professional development through one – two significant examples.

N.B. Within each section there is an 'Other' sub-heading, under which you can add strong examples which meet the spirit of the examined competence but which may not fit into the pre-populated sub-headings. TlChemE's membership team may be able to help you if you are unsure (N.B. The same rules apply here: 'when in doubt, ask about').

Step 2 – Record your learning

Make a good start with record-keeping in your daybook or in a digital record of your activities using Word or Excel. You can then transfer strong examples into a template for the IChemE report. You will tend to notice that over time, your examples will grow from simple exercises to more substantial works as you gain experience and become a more independent engineering professional.

In my case, I created a matrix (see blank example structure below) as an action tracker against each of the competencies of the Competence and Commitment report. This way, I could see where to focus my attention. I captured the relevant development actions I had completed through on-the-job training during my early career. I was able to clearly see which competencies I had achieved, record my actions, and to put a date against them, including contextual information such as – the team I worked in, which project I worked on, etc. This helped me remember the specifics of the work I did as time moved on.

Furthermore, because I had set up my matrix to highlight the gaps in my experience, I found it was a useful lever in negotiations with my manager and team-mates when I sought to get involved in the activities which would help me fill the remaining gaps.

IChemE Competency (from Competence and Commitment report).	Action taken in this area (on the job learning/training course/self-directed learning).	Date (for your record keeping on the detailed reports/notes).	Team + Project I worked on.	Development areas for on the job learning (for ongoing and forward planning for personal development).
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Table showing an example experience record matrix.

N.B. When writing up your experience, use sound process safety and engineering terminology. This will help frame your written experience as coming from a professional and will save you time in extra redrafting to 'sound professional' later on. Furthermore, if you do not fully understand some terms, or find it hard to articulate clearly, reach out to your team-mates, a qualified engineer or a senior team member who can help. Above all, simply say what you want to say in plain words, then write that down and develop the technical language around that. This aids the reader by clearly describing what happened and show you were effective in demonstrating your competence.



Step 3 – Draft your application forms and reports

Having an electronic record made it much easier for me to collate, swap around, and redraft my examples of competence. It also made it easier to redraft and update my report when I had better examples to add.

I wrote my strongest examples together into clear sections against each of the main competencies and the sub-sections. I used the structure to help guide my writing and to keep 'on-track'. This does not stop you from writing the report in another way which works better for you. For example, I later redrafted my report as a two column table, with my competency examples on the left. In the right-hand column, I wrote annotations against the places in the text which highlighted the competencies I had demonstrated.

Step 4 – Submission

Here the IChemE guides can lead you through these final steps to the application process. Sometimes your report may be returned with comments, queries and requests for clarification from the interviewers. When these comments are not clear or you feel there is ambiguity, do reach out to IChemE for help. I found that the contacts in their membership team were very helpful in this capacity too.

Learn at lunch

Lunch and learns are an excellent informal learning resource which is increasingly common among engineering firms and energy companies. They serve to bridge a gap which is opening up as fewer and fewer senior personnel remain in the industry, now taking retirement or going into consultancy.

The main structure of lunch and learns is an informal presentation from a senior leader, a subject matter expert or a peer, presenting on a novel topic, some key skills to be learned by the group or some new trend in the industry.

They may or may not come with a free lunch attached, but unsurprisingly, a higher attendance is often seen when a free lunch is provided.

They offer a great broadening of your exposure to different subjects, different perspectives and people within your organisation. Third party presentations from your company suppliers are also useful, as you can learn about their perspective and what drives their business.

ACTIVITY

Work with your line manager to develop a Lunch and Learn programme for the graduates in your team (if you do not already have one). Think laterally about the kinds of skills and interests of the group and put something together that they will benefit from.

If your company already has a lunch and learn programme, why not volunteer yourself to give a presentation? It can be about anything you feel is valuable in terms of skill building, graduate development and experience or even related to some work you're currently undertaking. Here are some sample topics to get you started:

- ▶ trends in chemical engineering/engineering industries
- ▶ useful skills for early career professionals
- ▶ present your personal development projects

Be different

To drive the world forward with progress we need to help solve the problems, snags and bottlenecks stalking the earth i.e.:

- ▶ how to feed and water the world's population
- ▶ how to home people in environments where the climate is increasingly unstable
- ▶ how to provide reliable energy sources for people to use in their lives

To meet these questions with solutions and partial solutions, we need differentiators – people who can take a sideways look at the situation and draw insight. People who can improve these systems, develop new systems and drive positive change, delivering inherently safer systems and greater value and the quality of life for all.

This guide aims to support pragmatic, practical efforts to approach these problems. By developing presenting skills and techniques as an engineering professional, you can create valuable work. If good skills and learning habits spread throughout an organisation, you enhance the value of your skills as your influence flows out into the engineering community as a best practice, saving other's time and arriving at solutions to these above-mentioned problems faster.

Deliver

Delivery is not simply meeting deadlines but being proactive when working, engaging the relevant parties, breaking stalemates and overcoming roadblocks. To deliver in the modern engineering workplace, whether at a processing site, a design office, or a regulatory body is to communicate and engage with people active in the space.

Collaborate

A key differentiator going forward in engineering, and the wider world, is collaboration. This includes managing interfaces. Where jurisdictions or borders or teams meet, an interface presents itself. Successful recognition of interfaces and then proactive engagement of the parties leads to success. If you can see the two or more perspectives in play on an issue, you are halfway towards a comprehensive solution for that issue.

Apply systems thinking

Think and see beyond the immediate task at hand to how your work fits into the greater scheme. See everything you do, or are part of, as an input or an output of something else. For example:

- you are tasked with designing a vessel, you take inputs such as temperature, flow and pressure, input to a design program such as HYSYS, generate the outputs and receive design dimensions for your vessel
- your output is a vessel with dimensions, inlet and outlet lines. You place these on a PFD (Process Flow Diagram) and draw it up on a P&ID (Process and Instrumentation Diagram). This is the output of your work
- the P&ID along with the datasheet you generate for that vessel serve as inputs to a safety review to determine the consequences of the various failure modes that can be associated with your design. The report and actions from that review are outputs
- the finished design with re-design changes and actions incorporated are the inputs to the finished package delivered to the client. The output is the design for a plant which handed over to the operator and operations team for their input

From this simple example, one can see the degrees of separation model clearly. Everyone on the design team impacts the day to day lives of the final operator personnel. Aside from immediate safety implications of an improperly designed, non-rated plant, the day to day hassles of poorly located valves and gauges meaning difficult operation or cumbersome layouts, requiring personnel to expend more effort than reasonably necessary to complete their jobs.

Aside from the physical aspects of the design, these personal annoyances weigh on operators, distracting them from paying close attention to the sounds, smells and sights of the plant, distracting from their innate knowledge and experience of the equipment.

By improving the way the human operator interacts with the plant, enables them to do better work, more efficiently. This is real progress and an aspiration of a finer grain of attention in future plant design should be pursued by the modern engineering workforce.

Summary

Each year, new engineering graduates enter the job market, with specialised technical knowledge, and unique ways of thinking about problems. Their technical grounding and engineering judgement is an excellent toolkit in an increasingly competitive global market for valuable STEM skills.

Evidently, there are formal engineering job opportunities, graduate schemes (with a fast-track to senior roles) and site-based roles available within the engineering sector. Engineering entrepreneurship opportunities with small businesses and start-ups are also a viable option and these are becoming more popular. Many fresh graduates may find their best fit through joining a small business or starting their own.

While many graduates possess great technical abilities, some may need support with developing a robust non-technical skill set. Consequently, graduates can choose to develop their soft-skills, communication and learning skills. This will help them spend more time on higher value analytical and creative tasks to solve the problems of today and tomorrow. This guide seeks to provide some support by engaging graduates and equipping them with the key core skills to handle the practical realities of their first role.

No problem is insurmountable. Thus junior engineers and technicians have many options open to them. Through fostering a personal thirst for learning and continuous professional development, graduates themselves can maximise their potential.



About the author

My name is Aaron White. During my A-levels, I developed a keen interest in chemistry, prompting me to pursue it further in my undergraduate degree. Understanding chemical reactions, and the role of structures in reaction intermediates was something that I was keen to explore. However, following my undergraduate degree, I decided to make a change and learn about process engineering, to gain an understanding of manufacturing operations. Leveraging my chemistry background, I opted to read a master's degree in engineering at University College London.

On completion of my studies, I was selected to work at WorleyParsons as a graduate process safety engineer. I thoroughly enjoyed my four years at the engineering contractor, exposing me to consequence analysis and risk studies, fire and gas systems, and active fire protection designs. Additionally, I was lucky enough to be selected to undertake a design review role in the WorleyParsons' Kazakhstan offices. Here we reviewed a tie-ins installation for new pig launchers and gained approval to proceed to construction. This late-stage development enabled a necessary change in field operation to support the projected oil production profile.

Following this, I sought further challenge and to add a commercial perspective with robust negotiation skills to my career. I wanted to gain exposure and the opportunity to grow within another company. I was successful in attaining a role at Shell Group following their rigorous Shell Recruitment Day. I am currently working as a Business Analyst in the Lubricants division. Day-to-day, I undertake quality analysis, cost of goods saving coordination, and coaching on quality. Additionally, in this first rotation, I have had the opportunity to travel to Germany, France and The Hague for site visits and training respectively. Presently, I am close to finishing my first 18-month rotation and I am looking forward to gaining further exposure in such a diverse company in my next rotation role.

I have written this guide to organisation and development as I have grown through this journey and I want to pass on my experiences and tips to new engineering graduates who are breaking into the engineering space.

You can follow me on my LinkedIn address here:

<http://linkedin.com/in/aaron-white-37b1111aa>

Feel free to reach out with any questions.
I hope you find this book useful.