

Purpose of the Career Learning Assessment CEng Exemplar Document

1. This Career Learning Assessment (CLA) exemplar document for Chartered Engineer (CEng) registration is designed for use primarily by candidates/applicants (these terms are interchangeable for the purposes of this document) who have sufficient experience at the appropriate level to have gained underpinning **knowledge** and **understanding** of engineering so as to be commensurate with that of a graduate from a Masters level qualification in engineering e.g. MEng or MSc. Thus, it should be considered that the CLA is, in effect, replacing a full-time academic qualification delivered at Masters Level.
2. This document will be used by IAgrE Membership Committee members/assessors and can also be seen as a guidance note for candidates, together with their sponsors and mentors.
3. The words **knowledge** and **understanding** are highlighted throughout this document – these two words are the ‘key’ to knowing whether or not to include information in the CLA Report. The definition of the word ‘career’ throughout is as stated within the Oxford English Dictionary as a person’s “course or progress through life (or a distinct portion of life)” or, alternatively “an occupation undertaken for a significant period of a person's life and with opportunities for progress”. This document should be read in conjunction with the Career Learning Assessment Report.
4. The aim of this Guidance Note is to improve the process of selection of those suitable for the CLA route to meet the academic requirements for registration. It is important to follow these guidelines and ensure that the academic requirements (and hence the CLA requirements) are understood to be purely about the technical **knowledge** and **understanding** that the applicant possess in relation to the CEng specifications as stated in the Engineering Council UK-SPEC.
5. This document specifically addresses the issues for applicants for CEng (in terms of the academic level to be demonstrated) but similar considerations apply for those seeking Incorporated Engineer (IEng) registration. The following key points should be considered by applicants when completing the Career Learning Assessment Report.
 - The assessment is of academic **knowledge** and primarily technical **knowledge**, i.e. **understanding** of underlying engineering principles. Competence may be based on learning what works through trial and error and may or may not require an **understanding** of the underlying principles.
 - The assessors are looking for convincing evidence. Mere assertions or statements without convincing explanations do not provide evidence. This is best provided by explaining how the candidate obtained the **knowledge** to carry out a particular task and/or by examples of where they relied on an **understanding** of engineering principles to complete a task rather than following an established procedure or standard.
 - Professional engineers should be able to communicate information concisely. Lengthy text or lists that include irrelevant information are unhelpful and are likely to lead to relevant information being overlooked.
 - Examples are generally a good source of evidence, but keep them brief to make the point.
 - Remember that the IAgrE Assessors are unlikely to know you or your work. Don't expect them to read between the lines as they might if they were a work colleague in the same company.
6. As a general guide to assessing the academic level of training and work based experience, Bachelors level (IEng) should provide a good **understanding** of current technology and the underlying engineering principles whilst Masters level (CEng) provides a detailed **knowledge** of underlying principles that would enable technology to be developed further or applied in novel ways. For example, a detailed **knowledge** and application of a pressure vessel code would represent Bachelors level (IEng) learning. Masters level (CEng) would be a detailed **understanding** of the underlying engineering principles behind the code and a demonstrated ability to design or evaluate features not covered by the code and requiring justification by reference to underlying engineering theory.
7. This document is deliberately not specific in terms of category of registration or industry sector. The examples given at the end of this document (Annex A) are also deliberately non-sector specific in order to assist in the appreciation of what is required rather than providing a template to replicate a candidate's own career that may be in the same/similar industry sector.

8. The following questions are laid out in the order they appear on the Career Learning Assessment Report.

Other advice for applicants

9. Avoid submitting pages of calculations in support of an application. In rare cases there may be some value in a calculation in support of an example but its relevance should be explained and it should be distinctive.
10. Similarly avoid enclosing engineering drawings or illustrations unless they are really essential to a thorough appreciation of the technical **knowledge** being evidenced and the point of them is explained.
11. While the aim is to assess applications on the basis of the submission it is likely that a significant number of applicants will be called for interview, particularly where their highest formal qualification is below an HNC (Regulated Qualification Framework for England Level 4). Providing a focused application that addresses the key questions will minimise the number of applicants requiring interview and simplify the interview process when it is required.
12. Working alongside Chartered Engineers may provide an indication of the level of technical **knowledge** but is not evidence of it. The work being carried out may not actually be at Chartered level or only partially so and/or the individual may not be involved to the same extent in the Chartered level work. The applicant needs to provide direct evidence of their personal **knowledge**.
13. The following may be helpful in identifying the type of example that would provide the required evidence.

*“For the “a” project I researched the available literature and identified “b” and “c” as the relevant and critical engineering principles for the task. I also consulted “d” an expert in this field and gained “e” as a further **understanding** of the issues and the factors to be considered. I used this information (specify) to develop a proposal (describing how the information was used.) I checked/confirmed that the proposal would meet the objectives by designing and carrying out tests/ trials of the critical features (or by modelling in some way.) The proposal was adopted and successfully completed. I learnt “f” and “g” as a result of undertaking this task which have/will be of value (explain how) on subsequent/future projects.*”

14. The most common criticisms made by the CLA Assessors of applications they review are:
- Candidates not demonstrating the depth of academic **knowledge**
 - Candidates giving more general information, such as on positions held, level of responsibility, financial control.
 - It was not clear that the CLA was a candidate’s opportunity to demonstrate that through their working career they have in the past, or are currently, working to Masters Level.
 - The candidate struggled to demonstrate his technical level at interview

Q1. What area(s) of engineering practice would you regard yourself as specialising in and how have you acquired and maintained the technical knowledge and understanding needed to be skilled in these area(s).

1. In this section the applicant is being asked to describe those specialist areas of engineering within which they have gained **knowledge** to Masters level, how they have gained this **knowledge** and how they maintain their technical **knowledge** to remain competent in this area. Good indicators of this might be:
 - specialist advice they provide for specific purposes
 - recognition of their skills by a third party or others coming to them for advice.
 - the applicant has built up this reputation over a number of years
 - the applicant is highly regarded within the organisation they work for and within the industry in general.
2. This section might read as a narrative of the applicant's professional, engineering career to date but must be written in terms of the **knowledge** they have gained over the years and the deep **understanding** they have of their specialist subject.
3. Most engineers end up specialising in a particular aspect of their discipline through the nature of the work that they do and this section asks the applicant to explain how their career has developed over the years in particular areas of agricultural engineering. Simply having worked in a field for "x years" does not provide much evidence. Applications need to indicate how technical **knowledge** has been developed. How this can be explained will depend on individual circumstances, but will probably include progression in the technical complexity of the work undertaken among other factors. However, a simple statement that work became more complex provides no evidence – the application needs to explain in what way it became more complex with reference to the **knowledge** that was gained and applied.
4. An applicant might, therefore, provide appropriate evidence of the following:
 - a sound process of research, based on collecting data, analysing it, modelling solutions, and gaining feedback.
 - use of formal and informal reporting media
 - the introduction of new equipment/systems/processes to provide a function now deemed necessary within an engineering process.
 - technical papers they have written
 - presentations given at technical symposia and/or conferences
 - involvement in academic and/or industrial research
 - examples of when their specialist **knowledge** has been sought/used by others to solve in-depth engineering problems
 - examples of how technical concepts have evolved and offer a critique on current thinking in their specialist area of engineering.
 - involvement in any technical research, either in a company or in collaboration with a university
5. The description of the **knowledge** and **understanding** gained from such endeavours should give a clear indication of the equivalent academic level to which the applicant has aspired, i.e. to Masters level.
6. An example of an agricultural engineering applicant would demonstrate a thorough **understanding** of agricultural engineering systems gained from an **understanding** of a range of standards, experience of designing systems for a range of applications including special circumstances outside of previous experience where the applicant used their **knowledge** to develop a solution (giving brief details). The applicant may now supervise and train others in this technical area or be someone to whom others turn for advice.
7. The candidate may choose to include formal training (see Question 5 in Appendix 3), personal research in relation to tasks, or more generally, and/or advice from colleagues and others with appropriate **knowledge**. It will be easier to assess the information where examples are provided. These should illustrate the acquisition or application of **knowledge** and not just the task carried out.

Q2. Explain the technical decisions/judgements that you are required to make in your current post and the underlying knowledge and understanding required to do this effectively. (If previous posts provides a better example of this please add information on this.)

1. This section asks the candidate to explain the level of responsibility they currently hold in terms of **knowledge** and **understanding** of technical matters. The purpose of which is to establish whether they are working at the level commensurate with that of a CEng and just lacks the academic qualifications. This section relates to the use of the applicant's underpinning **knowledge** to resolve complex engineering problems, both systematically and creatively, to demonstrate how they identify and agree appropriate research methodologies, and how they assemble the necessary resources. If the previous section reads as a narrative of one's professional, engineering career to date, this section is very much a description of the typical engineering problems that the applicant encounters in their present position or last technical position. It is seeking information about how they use the **knowledge** and **understanding** of a specialist, engineering subject, built up over the years, to solve today's engineering problems.
2. The applicant should refer to how they collect, analyse and evaluate the relevant/available data, and how they then draft, present and agree the findings. The intent is to discern the technical **knowledge** needed to make these decisions and applicants should explain not just the types of decisions but also the technical **knowledge** that is utilised in terms of the underlying theory or engineering principles – i.e. not just based on what is normal practice based on experience.
3. Clearly the CLA Assessors are looking for decisions and judgements that require technical **knowledge** at the appropriate professional level. There seems to be a trend, however, to describe decisions made as a technician because these are more obviously technical; this is unhelpful. Decisions made at a more senior level often involve a mix of technical and economic or commercial factors but it should be possible to explain the technical factors that influence the decision. It may be necessary to mention the commercial and economic factors to set the technical factors in context but they should not be the primary focus. How much money was saved or the project size, for instance, may be important from a job perspective but is only a subsidiary factor in a CLA application.
4. The CLA Assessors will be looking for examples of:
 - technical originality in solving engineering problems to reach innovative solutions
 - how the applicant uses and develops research: both original research and/or empirical data analysis.
 - how the applicant reviews the potential for enhancing engineering products, processes, systems and services
 - how the applicant explores the potential, within their own responsibilities, for new opportunities.
5. In this section it is vital that the applicant clearly demonstrates their personal responsibility. The applicant may be a team leader, but this section requires them to explain their individual achievements, rather than those of the team. Candidates need to be able to demonstrate self-direction and originality in tackling and solving problems and the ability to act autonomously in planning and implementing tasks at a professional or equivalent level.
6. Where the applicant is now in a management role with a broad range of responsibilities it may be appropriate to provide information on their original area of specialism as well as explaining how they developed the technical **knowledge** required for their current role, e.g. how do they have the **knowledge** to evaluate technical proposals put forward by staff.
7. Examples of technical judgements or decisions taken in the course of one's work could be:
 - the identification of key plant to be audited and accredited
 - an investigation into new processes or techniques
 - taking a leading technical role in the introduction of new equipment or systems.
8. Of particular importance are examples of the judgements/decisions made in non-routine situations where the decision has to be based on a broader or deeper **understanding** of the relevant technical field than decisions driven by procedures. Any examples should explain the level of **knowledge** needed to reach a decision and any research carried out to aid the decision. As in the previous section, the description of the **knowledge** and **understanding** should give a clear indication of the equivalent academic level to which the applicant has aspired. i.e. for a CEng applicant this would be to Masters level.

Q3. Give an example(s) of where you have used your underlying technical knowledge and understanding to develop a solution(s) to a novel, unusual or complex situation.

1. This is a key section and some thought should be given to the most appropriate example(s) used. Whilst the other sections in this report cause the applicant to take a holistic view of their career and describe their decision making accordingly, this section demands that the applicant clearly demonstrates technical originality in [personally] solving a specific engineering problem. The applicant should explain the obstacles faced and how they were overcome and will also need to be able to justify why their proposal was original and how the solution was truly innovative. The example(s) must bring out the applicant's **knowledge** of underlying engineering principles.
2. There is a tendency for applicants to quote projects or tasks that have been important from a career point of view rather than those which provide the best evidence of technical **knowledge**. Applicants should choose examples that bring out their technical **knowledge** and ensure that the relevant **understanding** of technical matters is explained in the example. It is very important to explain what was learned. Simply saying a textbook was consulted or the issue discussed with a subject expert, provides little evidence unless the insight or **understanding** gained is explained, i.e. what did the applicant know or was able to do after the research that they did not know or were unable to do before.
3. Generally two, or at the most three, examples should be able to provide the necessary evidence. Such work could have:
 - developed earlier formal academic research work
 - instigated empirical data analysis to Masters level within an industrial environment to solve a complex, technical problem.
 - drawn out different areas or aspects of technical **knowledge** and its application in a novel, unusual or complex situation.
 - increased the applicant's technical **knowledge** significantly in specific fields of engineering/scientific research
4. The candidate will almost certainly have researched new or unusual aspects and acquired additional **knowledge**. The example(s) should explain how this was done as well as the application of **knowledge** to solving the problem at hand.
5. It should be possible to communicate the key evidence on an individual example in 300-400 words. An applicant who is now in a management position is likely to have to refer back to an example when they were in a technical role a few years back and this is understood. Otherwise it is better to select fairly recent examples if possible. Referring to examples from shortly after completing an apprenticeship or prior to a significant piece of formal learning is likely to raise doubts in the minds of the CLA assessors as to whether it really provides evidence of the required level of **knowledge**.
6. A typical example might read:

"An alternative XXXXX technology study involved research and assessment of available and developing XXXXXX units. The subject warranted extensive study into safety, performance and installation considerations. This necessitated both technical and cost modelling work to produce a balanced comparison to support a concept decision paper. A shortlist of new and existing technology candidates was established that met initial review criteria. However, one of the most promising options from a XXXXXXXX standpoint had to be excluded due to an inability to meet the required XXXXXX prevention. In order to move the subject forward I undertook a secondary study to investigate XXXXXX within the new technology option, using the following steps ..."

Q4. In what non-technical areas have you acquired an enhanced level of knowledge and understanding (e.g. finance, project management, commercial) and provide example(s) of responsibilities which require you to have this level of knowledge and understanding.

1. Chartered Engineers need to be 'well-rounded' individuals who, with a breadth of **knowledge**, are able to adapt to various situations. Thus, this section requires the applicant to provide evidence of how they can identify the required cost, quality, safety, reliability, and appearance, fitness for purpose and environmental impact of a solution to an engineering problem. The CLA Assessors will be looking for evidence of **knowledge** and **understanding** of such matters as:
 - finance/accounting principles
 - project management techniques
 - national and international legislation covering areas such as intellectual property (IP), environmental, safety which are particularly pertinent to one's industry
 - commercial matters including marketing principles, sales techniques, customer focus.
 - risk assessments
 - health and safety
 - environmental responsibilities
2. In this section it is the scale of the responsibility which will give a good indication of the category of registration, for example, project managing the introduction of engineering equipment significant to the continuing prosperity of the company would typically be a CEng role whilst managing the replacement of a piece of outdated, ancillary equipment with a modern alternative could be considered to be a typical IEng role. Significant depth of **understanding** of these areas is not needed (unless it is a requirement for a specific job.) It is sufficient **knowledge** to be able to interact competently with others and appreciate the importance of factors which may impact on the candidate's role that is required. Those in a specialised technical role may need to give more thought to how they provide this evidence than those in a project management role.
3. Candidates will also need to be able to demonstrate evidence of the transferable skills necessary for employment such as:
 - the exercise of initiative and personal responsibility
 - decision making in complex and unpredictable situations
 - the independent learning ability required for continuing professional development
 - calculating the commercial value of work
 - responsibility for self and team during work in active plants
4. Applicants by definition will have a significant level of experience and are often in a position of responsibility so that providing sufficient evidence of appropriate non-technical **knowledge** should not be difficult. Examples where this has been an issue have tended to be cases where experience is below the guidelines and the applicant has not been able to demonstrate the necessary technical **knowledge** either. However, it is still necessary to provide suitable evidence of **knowledge**, rather than simple assertions of competence, in this section.

Q5. What training courses have you undertaken that you consider as providing knowledge and understanding at a level at, or above, a Bachelor degree? (This might include University MSc modules or short courses and specialist courses organised by your company or third parties. If none, please indicate not applicable.)

1. This section is seeking information about courses attended by the applicant that may have provided **knowledge** that is at or close to Masters level, and is primarily seeking information on technical courses that have invariably provided the necessary theoretical **understanding** which underpinned the fundamental aspects of the subsequent training. Other courses that have built **knowledge** in the area in which the engineer practices, even if not clearly at Masters level are next in importance. It is not a request to list all courses attended. The most relevant courses are those which have been formally assessed, such as MSc modules.
2. The applicant should provide brief details such as:
 - university/provider delivering the course
 - date(s) when the course was taken
 - module/course title
 - academic level (if known)
 - a brief outline of the content and learning outcomes
 - details and qualifications of course 'tutor'
 - a brief description of the **knowledge** gained
 - details of any formal assessment
3. Other technical courses may just be listed but they should have some relevance to building technical **knowledge**, e.g. a one week course on advanced Finite Element Analysis organised by an in-house training provider which was then used to carry out detailed analysis of a component which resulted in an improvement to the design and/or saving in material/manufacturing costs. The link between the **knowledge** gained and its application is, thus, made clear. Applicants should be selective if there is a number of potential examples. The CLA Assessors will not spend a lot of time trying to work out what might be relevant from a long list.
4. Non-technical courses are only likely to be relevant if they are clearly at a high academic level i.e. Bachelors and above. Typical non-technical courses that could be included are:
 - a formal business management qualification/course
 - a significant project management qualification/course
 - a NEBOSH qualification in safety or similar.
5. A NEBOSH certificate, for example, could be relevant to an engineer working in industry if they can give examples of where they have used it to assist in a design, construction or maintenance application, but if they are unable to apply the **knowledge** they have gained, then, it is less relevant.
6. As with technical courses the CLA Assessors will not be interested in courses of a relatively low academic level. Thus, typical non-technical courses that should not be included are:
 - health and safety training
 - induction training
 - equality & diversity awareness
 - first aid courses
7. Therefore, if including courses in this section it is important to mention any assessment within the course, who delivered the course and how you have applied the **knowledge** gained from the course in the workplace. It is not mandatory to include any training in this section and you should not include any courses that were not at the appropriate academic level. If you are not including any courses in this section, state within this box that the question is not applicable.

Q6. Please provide detail of any other evidence that you feel is relevant but has not been covered in your previous answers.

1. This final section is the applicant's opportunity to mention any other relevant technical **knowledge** or **understanding** to Masters level gained during their career, not mentioned in any of the previous sections and that does not fit naturally within the scope of the other questions. Rather like the previous section, it is not a requirement to complete this section, if there is nothing else to say and, as before, is very much a 'scene setter' to assist the CLA Assessors get a 'feel for' how the candidate's career has progressed more generally. The most relevant information will relate to evidence of technical **knowledge** at the relevant level, and so, examples might include:

- the applicant has lectured as an industrialist on a university course
- the applicant has written technical papers and/or presented at a conference
- the applicant offers/applies technical expertise outside the work environment
- the applicant has given a presentation to students or at an IAgrE event
- the applicant has contributed to standards or best practice within the workplace