

MCIBSE Competence Framework: Digital Engineering Evidence Examples

Members develop solutions to engineering problems using new or existing technologies, through innovation, creativity and change and/or they may have technical accountability for complex systems with significant levels of risk.

A. Knowledge and understanding

A Member shall use a combination of general and specialist engineering knowledge and understanding to optimise the application of existing and emerging technologies.

This competence is about the ability to understand the underpinning technical principles relevant to the applicant's area of expertise and practice and apply them to develop appropriate technical solutions. This could involve developing solutions for novel problems or dealing with significant technical complexity by the integration of a range of technologies and consideration of other factors. This competence requires that an applicant is maintaining and developing their knowledge in their field of practice and not just that required for specific tasks.

Objective	Evidence Examples	Digital Evidence Examples
A1. Maintain and extend a sound theoretical approach to enable you to develop your particular role.	- Formal training related to your role. - Learning and developing new engineering knowledge in a different industry or role. - Understanding the current and emerging technology and technical best practice in your area of expertise. - Developing a broader and deeper knowledge base through research and experimentation. - Learning and developing new engineering theories and techniques in the workplace.	- Completed training related to digital engineering. This could be software or engineering related to your development. - Read, understand and use on projects, the relevant codes & standards for your region and your role. - Taking part in research or testing projects where you have gained new knowledge. - Show how you have increased your knowledge in the workplace. For example, use of new software or applications, knowledge of standards or engineering practices or a new way of working or workflow. - Developing knowledge by attending conferences, seminars or CPDs. How did you implement this? - Journals or other industry publications, blog or a print that is Engineering, Architectural or software related.

Objective	Evidence Examples	Digital Evidence Examples
A2. Develop technological solutions to unusual or challenging problems, using your knowledge and understanding and/or dealing with complex technical issues or situations with significant levels of risk.	- Carrying out technical research and development. - Developing new designs, processes or systems based on new or evolving technology. - Carrying out complex and/or non-standard technical analyses. - Developing solutions involving complex or multidisciplinary technology. - Developing and evaluating continuous improvement systems. - Developing solutions in safety-critical industries or applications.	- Explain your role in any development or research projects that you have been part of. Outline your tasks and any outcomes. - Participated in or led a working group focused on development of solutions for continuous improvements and efficiencies. - What coordination processes have you led or implemented on your projects? Have you introduced/developed any new workflows/solutions? - Testing or evaluating new systems or software. This could be an add-in or a whole system. What process did you use to evaluate this?

B. Design, development and solving engineering problems

A Member shall apply appropriate theoretical and practical methods to the analysis and solution of engineering problems.

This competence is about the ability to apply engineering knowledge effectively and efficiently in a safe and sustainable way to the individual tasks which need to be undertaken in the applicant's role in association with both new and existing clients and other team members.

Objective	Evidence Examples	Digital Evidence Examples
B1. Take an active role in the identification and definition of project requirements, problems and opportunities.	- Identifying projects or technical improvements to products, processes or systems. - Preparing specifications, taking account of functional and other requirements. - Establishing user requirements. - Reviewing specifications and tenders to identify technical issues and potential improvements. - Carrying out technical risk analysis and identifying mitigation measures.	- Development of BIM/digital processes, workflows and standards. - Identifying an issue and developing a system to resolve this. Could be through training, process or standards. - Experience in reviewing and feeding back on tenders and digital requirements on projects. - Showing experience in reviewing projects, highlighting risk or technical issues. - Testing and implementing new software and development of workflows for your company.

Objective	Evidence Examples	Digital Evidence Examples
	- Considering and implementing new and emerging technologies.	
B2. Identify the appropriate investigations and research needed to undertake the design, development and analysis required to complete an engineering task and conduct these activities effectively.	- Identifying and agreeing appropriate research methodologies. - Investigating a technical issue, identifying potential solutions and determining the factors needed to compare them. - Identifying and carrying out physical tests or trials and analysing and evaluating the results - Carrying out technical simulations or analysis. - Preparing, presenting and agreeing design recommendations, with appropriate analysis of risk, and taking account of cost, quality, safety, reliability, accessibility, appearance, fitness for purpose, security (including cyber security), intellectual property constraints and opportunities, and environmental impact.	- Trial and testing of new software. Explaining the process taken. - Part of or organising trials with analysis software. This could be the connection to authoring software or implementing a new process or calculations. - The use of scripting to resolve design problems. Outlining the process used. - Research on solutions used on projects. Can you demonstrate innovative solutions that you have developed and implemented on your projects?
B3. Implement engineering tasks and evaluate the effectiveness of engineering solutions.	- Ensuring that the application of the design results in the appropriate practical outcome. - Implementing design solutions, taking account of critical constraints, including due concern for safety, sustainability and disposal or decommissioning. - Identifying and implementing lessons learned. - Evaluating existing designs or processes and identifying faults or potential improvements including risk, safety and life cycle considerations. - Actively learning from feedback on results to improve future design solutions and build best practice.	- Implementation of a process or workflow to improve design outcomes. - Assessing outcomes and effectiveness of outcomes. Discuss the feedback loop. - Have you led or been part of a lessons learnt process? Explain your role and how you have implemented change. - This could be connected to software that improves project efficiency. How was this identified and developed? - Outline your involvement in any Design for Manufacturing and Assembly (DfMA) processes or development of prototypes.

C. Responsibility, management and leadership

A Member shall demonstrate technical and commercial leadership.

This competence is about the ability to plan the applicant's own work and manage or specify the work of others effectively, efficiently, and in a way which provides leadership at an appropriate level, whether technical or commercial. Leadership is not necessarily about having a formal line management role. In matrix management and other types of organisational structure, where the applicant is working within complex and varied working relationships, they will provide leadership to achieve objectives. This competence is also about the ability to consider and identify improvements to quality.

Objective	Evidence Examples	Digital Evidence Examples
C1. Plan the work and resources needed to enable effective implementation of engineering tasks and projects.	- Preparing budgets and associated work programmes for projects or tasks. - Systematically reviewing the factors affecting the project implementation including safety, sustainability and disposal or decommissioning considerations. - Carrying out a task or project risk assessment and identifying mitigation measures. - Leading on preparing and agreeing implementation plans and method statements. - Negotiating and agreeing arrangements with customers, colleagues, contractors and other stakeholders, including regulatory bodies. - Ensuring that information flow is appropriate and effective.	- Demonstrate how you have managed a team, the resourcing, budgets and project tasks. - Show how you have led a digital team on a project. Engagement with clients, run internal or external coordination meetings, managed the deliverables. - Explain your part in the development of BIM execution plans with the design team and any other associated documents. - If you have assisted a client to develop the Employers Information Requirements, explain this process. - Show how you have checked the deliverables have met the agreed standards on your projects.
C2. Manage (organise, direct and control), programme or schedule, budget and resource elements of a significant engineering task or project.	- Operating or defining appropriate management systems including risk registers and contingency systems. - Managing the balance between quality, cost and time. - Monitoring progress and associated costs and cost forecasts, taking appropriate actions when required. - Establishing and maintaining appropriate quality standards within legal and statutory requirements.	- How do you manage your team? What meetings do you join or lead to do this and what systems do you use? - Explain how you monitor time, quality, and cost of digital deliverables across your team and for others? - Explain how you interface with external clients, contractors, architects etc. This could be coordination, meeting in person, phone or VC calls.

Objective	Evidence Examples	Digital Evidence Examples
	- Interfacing effectively with customers, contractors and other stakeholders.	
C3. Lead teams or technical specialisms and assist others to meet changing technical and managerial needs.	- Agreeing objectives and work plans with teams and individuals. - Reinforcing team commitment to professional standards. - Leading and supporting team and individual development. - Assessing team and individual performance and providing feedback. - Seeking input from other teams or specialists where needed and managing the relationship. - Providing specialist knowledge, guidance and input in your specialism to engineering teams, engineers, customers, management and relevant stakeholders. - Developing and delivering a teaching module at Masters' level or leading a university research programme.	- Development and delivery of training. - Management of a team – How do you support each team member and their development? - Explain any review / appraisal process that you have with your team. - What have you done to share your digital experience and knowledge across your organisation? - Share which types of training you have delivered and the recipients? - Have you delivered any internal or external technical or digital presentations?
C4. Bring about continuous quality improvement and promote best practice.	- Promoting quality throughout the organisation as well as its customer and supplier networks. - Developing and maintaining operations to meet quality standards e.g. ISO 9000, EQFM. - Supporting or directing project evaluation and proposing recommendations for improvement. - Implementing and sharing the results of lessons learned.	- Engagement with QA and QC systems and processes. Perhaps to align with any industry standards? - Review of deliverables and communication of findings through recommendations. - Explain how you have used a CDE on a project. - What have you done to improve best practice across your project or business?

D. Communication and interpersonal skills

Members shall demonstrate effective communication and interpersonal skills.

This competence is about the ability to work with others constructively, to explain ideas and proposals clearly and to discuss issues objectively and productively.

Objective	Evidence Examples	Digital Evidence Examples
D1. Communicate effectively with others, at all levels, in English.	- Preparing reports, drawings, specifications and other documentation on complex matters. - Leading, chairing, contributing to and recording meetings and discussions. - Exchanging information and providing advice to technical and non-technical colleagues. - Engaging or interacting with professional networks.	- Delivery of internal or external presentations. - Setting up and leading meetings. This could be internal or external. - Demonstrate any development you have led for others. This might be training courses or workshops. - Outline your participation in any industry related networks.
D2. Clearly present and discuss proposals, justifications and conclusions.	- Contributing to scientific papers or articles as an author. - Preparing and delivering presentations on strategic matters. - Preparing bids, proposals or studies. - Identifying, agreeing and leading work towards collective goals.	- Outline your role in the proposal & RFP process. Have you answered any digital related questions, a capability statement or been to project interviews? - Have you led or been a member of the team to develop a business plan? Explain this. - Have you taken part of any company strategy processes, explain this.
D3. Demonstrate personal and social skills and awareness of diversity and inclusion issues.	- Knowing and managing own emotions, strengths and weaknesses. - Being confident and flexible in dealing with new and changing interpersonal situations. - Identifying, agreeing and working towards collective goals. - Creating, maintaining and enhancing productive working relationships, and resolving conflicts - Being supportive of the needs and concerns of others, especially where this relates to diversity and inclusion.	- Have you taken any courses to develop your soft skills? This could include emotions, strengths and weaknesses. - Explain where you have had to deal with a challenging situation. This might be a difficult client or a problem with a staff member. Explain how you approached and resolved this. - How have you supported the different needs and requirements of your team?

E. Personal and professional commitment

A Member shall demonstrate a personal commitment to professional standards in a safe and environmentally acceptable way, recognising obligations to society and the profession as a whole.

This competence is about ensuring that the applicant is acting in a professional and ethical manner, as defined in CIBSE's Code of Conduct, in their work and in their dealings with others. A Member should set a standard and example to others ensuring they undertake and record appropriate continual professional development.

Objective	Evidence Examples	Digital Evidence Examples
E1. Understand and comply with relevant codes of conduct.	- Demonstrating compliance with CIBSE's Code of Professional Conduct. - Identifying aspects of the Code which are particularly relevant to your role. - Being aware of the legislative and regulatory frameworks relevant to your role and how they conform to them. - Leading work within relevant legislation and regulatory frameworks, including social and employment legislation.	- Demonstrate that you have read and agree with the code of professional conduct. - Explain how the code of conduct relates to your role? - How do you keep up to date with these standards?
E2. Understand the safety implications of their role and manage, apply and improve safe systems of work.	- Identifying and taking responsibility for your own obligations and ensuring that others assume similar responsibility for health, safety and welfare issues. - Ensuring that systems satisfy health, safety and welfare requirements. - Developing and implementing appropriate hazard identification and risk management systems and culture - Managing, evaluating and improving these systems. - Applying a sound knowledge of health and safety legislation, for example: HASAW 1974, CDM regulations, ISO 45001 and company safety policies.	- How have you implemented health, safety and welfare into your projects. This could be a process or development of systems. - Demonstrate how your knowledge of health, safety and welfare and the related standards is kept up to date. This could be online or site training, Certifications. - Do you manage or review these standards? Explain how. - Are you applying health, safety and welfare to your models, drawings, or documents? Explain what you are doing.
E3. Understand the principles of sustainable development and apply them in their work.	- Operating and acting responsibly, taking account of the need to progress environmental, social and economic outcomes simultaneously. - Providing products and services which maintain and enhance the quality of the environment and community and meet financial objectives.	- Explain how you have applied sustainability principles to your role. - Explain how you act in your day-to-day life to ensure you behave responsibly, consider environmental, social and economic outcomes.

	- Recognising how sustainability principles, as described in the Engineering Council's Guidance on Sustainability, can be applied in your day-to-day work. - Understanding and securing stakeholder involvement in sustainable development. - Using resources efficiently and effectively in all activities. - Taking action to minimise environmental impact in your area of responsibility.	- What action do you take to reduce environmental impact? This might be different approaches to design, implementing software or reduction of materials. - Demonstrate how your digitalisation work is enabling more sustainable behaviour across your organisation and/or your client's organisations.
E4. Carry out and record the Continuing Professional Development (CPD) necessary to maintain and enhance competence in their own area of practice.	- Undertaking reviews of your own development needs. - Planning how to meet personal and organisational objectives. - Carrying out and recording planned and unplanned CPD activities. - Maintaining evidence of competence development. - Evaluating CPD outcomes against any plans made. - Assisting others with their own CPD.	- Explain how you are progressing your development? CPD activities or training, attending conferences, research etc. - How are you recording evidence of this development? - How have you set goals and worked toward these goals? - Explain how you have supported your team to achieve their goals. - Are you part of any industry groups? Outline your roles and activities.
E5. Understand the ethical issues that may arise in their role and carry out their responsibilities in an ethical manner.	- Understanding the ethical issues that you may encounter in your role. - Giving an example of where you have applied ethical principles as described in the Engineering Council's Statement of Ethical Principles. - Give an example where you have applied or upheld ethical principles as defined by your organisation or company.	- Explain what the ethical issues mean to you and how this is applied in your work. - Select a few of the principles and give examples where you have applied them in your professional or personal life. - Example where you have stood by your design decisions, even if pressure to take shortcuts.