BECOMING AN INCORPORATED ENGINEER

IHIE | INSTITUTE OF HIGHWAY INCORPORATED ENGINEERS

THE INCORPORATED STATEMENTS OF COMPETENCE

This document:

- **Defines an Incorporated Engineer**
- **Explains the Incorporated competence and commitment standards set by the Engineering Council (UK)**
- **Gives guidance on applying the standards in highways and transportation**
- **Lists typical documents and schemes you might submit for Review**
- **Explains how to use an NVQ4 portfolio.**
- **Gives examples of a document matrix or schedule**

WHAT IS AN IENG

Incorporated Engineers are the mainstream operational managers at the forefront of developing technology: "*They are characterised by their ability to act as exponents of today's technology through creativity and innovation. To this end, they maintain and manage applications of current and developing technology, and may undertake engineering design, development, manufacture, construction and operation. Incorporated Engineers are engaged in technical and commercial management and posses effective interpersonal skills. They demonstrate a personal and professional commitment to society, to their profession, and to the environment*".

IHIE members include traffic management engineers, network managers, maintenance engineers, development control officers, transportation planners, highway designers, signals engineers and project managers and the example documents reflect this diversity.

Remember that, although you may work in a team, the Institute wants to know what you do, what you recommended, and what the extent of your personal responsibility is.

The following pages set out the Engineering Council's Statements of Competence and Commitment with IHIE guidance alongside and list typical documents you could select to illustrate your experience.

FURTHER INFORMATION

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The EC Standard	IHIE Guidance
A. Use engineering knowledge and understanding to apply existing and emerging technology	
A.1 Maintain and extend a sound theoretical approach to applying technology in engineering practice	
Typically this includes an ability to: • Identify the range of your personal knowledge and skills. • Strive to extend your technical capability • Broaden and deepen your knowledge through changes in applications and techniques.	***In your submission, show you:*** - have extended your knowledge - critically evaluate your learning - know, understand and apply current relevant legislation, specifications, codes of practice, trade publications, software and guidance by referring to them in your report. - give appropriate advice - learn and apply new practice
A.2 Use a sound evidence-based approach to problem solving and contribute to continuous improvement	
Typically this includes an ability to: • Establish users' requirements for improvement • Use your knowledge of technological developments to promote and improve the effectiveness of systems or services you are concerned with. • Contribute to evaluating and developing continuous improvement systems • Solve problems using first principles	***In your submission, show you***: - investigate, identify and agree client, user and community requirements - apply engineering principles to solve client needs - critically evaluate data - are logical - critically evaluate evidence from best practice, - recommend or apply departures from standards - know "why" as well as "how" - use feedback from previous schemes to improve your next ones.

Typical documents which you could include might be:

Client briefs
Inception reports
Feasibility reports
Commission reports
Design option appraisals with costings
Interpretation and analysis and application of survey results or other data in reaching a design solution
Use of databases
Transport policies, strategies and plans, (LTPs , Local frameworks)
Transport assessments, Travel plans
Safety audit reports
Test results and interpretation
Failure investigations
Use of relevant computer software
Appeals statements
Cost benefit analyses
Value engineering exercises
Correspondence demonstrating engineering knowledge

These are suggestions only; your choice will depend on your work experience.

The same documents may also be used for Statement B etc

The EC Standard	IHIE Guidance
B. ***Apply appropriate theoretical and practical methods to design, develop, manufacture, construct, commission, operate and maintain products, equipment, processes, systems and services***	
B.1 Identify, review and select techniques, procedures and methods to undertake engineering tasks	
Typically this includes an ability to: • Select a review methodology • Review the potential for enhancement using evidence from best practice • Establish an action plan to implement the results of the review	***In your submission, show you:*** - conduct surveys - investigate relevant factors - identify and evaluate options - use and interpret good practice guides etc. - develop and test options - recommend optimum solutions which contribute to improved social, economic and environmental outcomes - can respond to unforeseen circumstances - set targets and draft programmes to schedule activities
B.2 Contribute to the design and development of engineering solutions.	
Typically this includes an ability to: • Contribute to the identification and specification of design and development requirements • Identify potential problems and evaluate possible engineering solutions taking account of cost, quality, safety, reliability, appearance, fitness for purpose and environmental impact • Contribute to the design of engineering solutions	***In your submission, show you:*** - conduct surveys - investigate relevant factors - identify and evaluate options - use and interpret national and local guides etc. - draft specifications - develop and test options - recommend optimum solutions which contribute to improved social, economic and environmental outcomes - can respond to unforeseen circumstances
B.3 Implement design solutions, and contribute to their evaluation and monitoring	
Typically this includes an ability to: • Secure the resources required • Implement design solutions, taking account of critical constraints. • Identify problems during implementation and take corrective action • Contribute to evaluating design solutions Contribute to recommending improvements and learn from experience and feedback.	***In your submission, show you:*** - exercise independent technical judgement - take responsibility - determine measures of success monitor and evaluate schemes

B. ***Apply appropriate theoretical and practical methods to design, develop, manufacture, construct, commission, operate and maintain products, equipment, processes, systems and services***

Typical Documents include:

Site investigation and condition reports
Traffic survey and data reports. Accident data and analysis reports. Road user or safety audits
Specifications you drew up
Preliminary designs and drawings
Detailed design drawings you prepared or initiated. Calculations
Alternative costings
Test reports
Design mixes
As built drawings. Site type approvals. Acceptance tests
Writing of, or interpretation of, design guides, safety statements
Technical advice statements or reports
Instructions on monitoring performance
Maintenance manuals. Maintenance schedules
Cost benefit analyses
Tender or appraisal reports you prepared,
Section 38 agreements.
Assessment reports
Evaluations of materials or processes.
Before and after studies(photographs)
Tender appraisal reports
Final account comparisons
Post-project evaluations
Maintenance schedules
Monitoring utilities

These are suggestions only; your choice will depend on your work experiences. ***The same documents may also be used for Statements A, C, E2 etc***.

The EC Standard	IHIE Guidance .
C. Provide technical and commercial management	
C.1 Plan effective project implementation	
Typically this includes an ability to: • Identify the factors affecting project implementation • Prepare and agree implementation plans • Identify roles in the project team • Secure the necessary resources • Apply the necessary contractual arrangements	***In your submission, show you:*** - plan the delivery of tasks, schemes etc. - identify resources and costs - schedule activities, materials and resources - prepare and agree contracts/work orders - monitor and evaluate after implementation
C.2 Manage the planning, budgeting and organisation of tasks, people and resources	
Typically this includes an ability to: • Operate appropriate management systems • Work to agreed standards, programme and budget within legal and statutory requirements • Manage work teams, coordinate project activities • Identify variations from standards, programme and budgets and take corrective action • Evaluate performance and recommend improvements	***In your submission, show you:*** - plan, organise, manage and control financial and other resources - manage tasks within financial, commercial and regulatory constraints - apply your organisation's financial regulations, standing orders and contract management procedures - prepare or manage budgets or estimates - prepare or assess costs, bids and tenders

The EC Standard	IHIE Guidance
C. Provide technical and commercial management	
C.3 Manage teams and develop staff to meet changing technical and managerial needs	
Typically this includes an ability to: • Agree objectives and work plans with teams and individuals • Identify team and individual needs and plan for their development • Manage and support team and individual development • Assess team and individual performance and provide feedback	***In your submission, show you:*** - manage yourself - plan activities and determine work methods to achieve objectives - manage teams (which can be internal or can include your client, consultants or contractors) - contribute to/carry out staff appraisals - contribute to/plan staff development *"Teams" may be your staff or all those concerned with delivering your project, including the public, clients, consultants and contractors.*
C.4 Manage continuous quality improvement	
Typically this includes an ability to: • Ensure team members and colleagues apply quality management principles • Manage operations to maintain standards • Evaluate projects and recommend improvements	***In your submission, show you:*** - promote quality - identify and evaluate changes to meet quality objectives - implement continuous improvement - contribute to quality audits - monitor, maintain and improve delivery of services

The EC Standard	IHIE Guidance
C. Provide technical and commercial management	
Typical Documents include: Work instructions Non standard tenders, manuals and guides written by you Progress meetings and action plans Works programmes Statutory undertaker enquiries, orders and co-ordination plans Works instructions, site diaries Exchanges of letters Scheme briefs and monitoring reports Minutes of meetings showing actions on you Budget control cash flow analyses Schedule of tasks with the delivery monitored Audit reports Preparation or evaluation of estimates, bids and tenders. Costings Bills of quantities Monitoring reports Estimates Planning gain agreements Partnering arrangements showing your role Monitoring reports Quality system reviews. Manuals you wrote Materials laboratory reports Applied Best Value PIs. Appraisal report Works programmes Project or Budget reports Works instructions	

The EC Standard	IHIE Guidance
D. Demonstrate effective communication and interpersonal skills	
D.1 Communicate in English and interact with others at all levels	
Typically this includes the ability to: • Contribute to, chair and record meetings and discussions • Prepare letters, documents and reports on technical matters • Exchange information and provide advice to technical and non-technical colleagues.	***In your submission, show you:*** Establish and maintain effective working relationships with colleagues, clients and others. Use drawings and other visual aids effectively. Respond effectively and efficiently to received communications. Select appropriate methods of communicating e.g. diagrams, sketches, plans, photographs, reports, internet, audiovisuals, I.T. Communicate fluently verbally and in writing at a professional level. Manage information. Prepare reports in a professional manner. Participate in and lead meetings
D.2 Present and discuss proposals	
Typically this includes the ability to: • Prepare and deliver appropriate presentations • Manage debates with audiences • Feed discussion results back to improve proposals	**Typical Documents include***:* Work or site instructions. Correspondence conducted by you Internal documents or briefing materials Minutes which show your participation Committee or cabinet reports you wrote Advice and recommendations you made Interpretative reports Public consultations you conducted Public inquiry evidence you prepared Public exhibitions you prepared or participated in Appropriate presentation of data Impact and environmental assessments Task planning and organisation documents. Training and development plans (also Role E4). *"All levels" means colleagues, subordinates, line managers, clients, consultants, utilities, developers, contractors, elected members, interest groups, the public – as applies to your job.* *"Teams" may be your staff or all those concerned with delivering your project, including the public, clients, consultants and contractors.* *The documents can be those already used for Roles A, B, and C.* *Appropriate voluntary activities may provide evidence for D1, D2 and D3* *Your Review report and your presentation at interview will be taken into account for Role D.* *Your Employer Proposer Form 301 should comment on your performance.*

The EC Standard	IHIE Guidance
D. Demonstrate effective communication and personal skills	
D.3 Demonstrate personal and social skills	
Typically this includes an ability to: • Know and manage your strengths and weaknesses • Be aware of the needs and concerns of other people and communities • Be confident and flexible in dealing with new and changing interpersonal situations • Identify, agree and work towards collective goals • Create, maintain and enhance productive working relationships and resolve conflicts	***In your submission, show you:*** Establish and maintain effective relations. Give clear and accurate instructions. Mentor colleagues. Assess the performance of others. Can resolve conflicts.

The EC Standard	IHIE Guidance
E. Demonstrate a personal commitment to professional standards, recognising your obligations to society, the profession and the environment.	
E.1 Comply with relevant codes of conduct	
Typically this includes and ability to: • Comply with IHIE's rules of professional conduct • Work constructively within all relevant legislation and regulatory frameworks, including social and employment legislation	***In your submission, show you:*** - know your organisation's goals and ethos (refer to its conduct statements) - behave appropriately and professionally - base opinions and actions on adequate knowledge - know the purpose of professional institutions and their codes of conduct - participate in institution activities - can resolve a conflict of interest or know the procedures to do so. At the Review, you should expect to discuss practical ethical issues and your professional aspirations.
E.2 Manage and apply safe systems of work ***Typically this includes an ability to***: • Identify and take responsibility for your obligations for health, safety and welfare issues • Manage systems to satisfy health, safety and welfare requirements • Identify and deal with potential hazards • Analyse, assess and manage risk • Manage, evaluate and improve these systems	***In your submission, show you:*** Design or plan safe systems. Analyse, assess and control risk. Identify and deal with potential hazards. Work safely. Accept responsibility for your own and others' safety. Are aware of emergency measures. Comply with HASWA, CDM regulations, company safety policy, all relevant legislation, codes of practice, transport and road safety. Know your role under CDM Regulations. ***Typical documents include:*** Risk Assessments Application of CDM regulations, Chapter 8, Codes etc. COSHH assessments and method statements Environmental or social impact assessments Reports recommending improvements in safety or the environment Safety audits Pre-tender health and safety plans. **Additional Guidance Notes on E2 and E3 are available from IHIE**.

The EC Standard	IHIE Guidance
E. Demonstrate a personal commitment to professional standards, recognising your obligations to society, the profession and the environment	
E.3 Undertake engineering activities in a way that contributes to sustainable development	
Typically this includes an ability to: • Operate and act responsibly, taking account of the need to progress environmental, social and economic outcomes simultaneously • Provide products and services which maintain and enhance the quality of the environment and the community, and which meet financial objectives • Understand and encourage involvement of stakeholders in sustainable development	***In your submission, show you:*** - Implement solutions, which comply with environmental regulations - Are aware of and adopt, where possible, sustainable practices. - Identified and addressed an environment or community issue and refer to relevant codes of practice. - Contribute to environmental impact assessments ***Evidence could include:*** - Reports of consultations with conservation and local groups - Environmental assessments - Waste disposal/recycling in your projects - LTPs, travel plans or green transport initiatives you wrote or to which you made a significant identifiable contribution.
E.4 Carry out the continuing professional development necessary to maintain and enhance your competence	
Typically this includes an ability to: • Review your development needs • Prepare action plans to meet personal and organisational objectives • Carry out CPD activities • Maintain evidence of developing your competence • Evaluate outcomes against your action plans • Assist others with their CPD	***In your submission, show you:*** Set goals to achieve personal and organisational objectives. Undertake professional development to enhance competence. Prepare and maintain a professional action plan. Keep CPD records of professional development activities. ***Include in your submission*** • a record over at least the last two years, showing 5 days p.a. of structured development which can include reading and research. • A structured Professional Development Plan including the years following a successful Review • 7 CPD days off the job education and training in the last two years. ***Typical documents include:*** Recent annual appraisals. IHIE CPD Forms. ***Expect to your discuss your learning experiences to date at the Review interview.***

Examples of Evidence Schedules

1. NVQ/SVQ4 Portfolios

If you choose to submit extracts of your SVQ or NVQ portfolio rather than Review Report etc, you need to send a schedule explaining how the NVQ units meet the Statements and cross referencing the evidence from your NVQ. In your explanation, state why the evidence meets our requirements much as for the Evidence Summary Forms but more briefly.

Role	NVQ Unit or element	Documentary Evidence	Explanation
A1	TRP 4/029	Appraisal form	
A2	TRP 4/C01 TRP 4/C02	Brief for Highway One Brief to survey team	
etc			

2. Trunk road/highway supervisor: A recent applicant's list of documents and how they related to the Roles.

Doc	Statement	A1	A2	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3	E1	E2	E3	E4
Doc 1	Personal development plan	✔											✔			✔	✔
Doc 2	Development action plan	✔								✔				✔			✔
Doc 3	Safety fencing certificate	✔															
Doc 4	Term maintenance works order		✔		✔			✔								✔	
Doc 5	Programme of works for surfacing			✔			✔					✔					
Doc 6	Site instruction		✔				✔		✔		✔	✔	✔		✔		
Doc 7	Scrim report		✔	✔			✔			✔		✔					
Doc 8	Works programme			✔			✔				✔						
Doc 9	Minutes of incident planning meeting								✔	✔	✔	✔	✔	✔			
Doc 10	Emergency incident Procedures				✔	✔		✔				✔					
Doc 11	Road Traffic Accident report					✔			✔			✔			✔	✔	
Doc 12	Scrim report and list of work orders		✔		✔	✔											
Doc 13	Correspondence with contractor re. poor practice and remedial actions								✔		✔			✔	✔		
Doc 14	QA Audit Form of contractor's work									✔							

3. Senior traffic engineer (£0.5 M annual budget): A recent applicant's list of documents and how they relate to the Roles.

Doc	Statement	A1	A2	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3	E1	E2	E3	E4
Doc 1	Design considerations for, Cricklade Scheme		✔			✔											
Doc 2	Accident investigations for Cricklade Scheme		✔														
Doc 3	AutoCAD design drawings for Crickade scheme		✔			✔											
Doc 4	AutoTRAX drawings for Cricklade Scheme		✔			✔											
Doc 5	Annual Works Programme		✔	✔			✔	✔	✔				✔				
Doc 6	Spreadsheet for structural calculations of T-Beam design		✔		✔												
Doc 7	Letter to speed limit requester		✔								✔						
Doc 8	Photographs of solar powered units															✔	
Doc 9	Specifications of Solar units															✔	
Doc 10	Brief for Valley Road pedestrian enhancement scheme			✔	✔		✔										
Doc 11	Down Lane – monitoring of works costs		✔	✔			✔	✔									
Doc 12	Draft minutes of progress meeting and return comments			✔			✔		✔		✔						
Doc 13	Schedule of works, costs, safety/risk assessment				✔	✔		✔		✔	✔				✔		
Doc 14	Down Lane – Manual speed counts					✔											
Doc 15	Down Lane – Safety Audit																
Doc 16	Down Lane – Snagging list						✔										
Doc 17	Design drawing for Silver Street signing				✔	✔										✔	
Doc 18	Down Lane – Evaluation Programme			✔	✔					✔							
Doc 19	Portham area LTP working group minutes and plan							✔				✔					
Doc 20	Letter to Contractors re invoice over estimated amount			✔				✔					✔				

Doc	Roles	A1	A2	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3	E1	E2	E3	E4
Doc 21	Letter to Consultants re posts correctly installed								✔								
Doc 22	Witness testimony from Manager re staff supervision								✔				✔				
Doc 23	Training Evaluation Form									✔							
Doc 24	Performance Review Form									✔							
Doc 25	Minutes of Senior Team Leaders' meeting								✔		✔		✔				✔
Doc 26	Presentation at National Traffic Management course										✔	✔					
Doc 27	Personal Development Plan – short term												✔				✔
Doc 28	File note on rectification of contractors' poor safety procedures													✔	✔		
Doc 29	Consultation leaflet for Down Lane															✔	
Doc 30	3-year Professional Development Plan												✔				✔
Doc 31	Letter re Signing review in Town													✔			
Doc 32	Professional Development Record	✔								✔							✔