

The Institution of Engineers, Malaysia

IEM



HOW THE OUTCOME-BASED COMPETENCE ASSESSMENT HELPS YOU AS A GRADUATE ENGINEER

CHEN HARN SHEAN

BEng (UM), MEng (NUS)

PEng (Msia & Spore)

FIEM, PMP, MAFEO, APEC Eng, IntPE



TARGET AUDIENCE – Engineering Team after Graduation

1. Graduate Engineer
2. Graduate Technologist
3. Graduate Technician

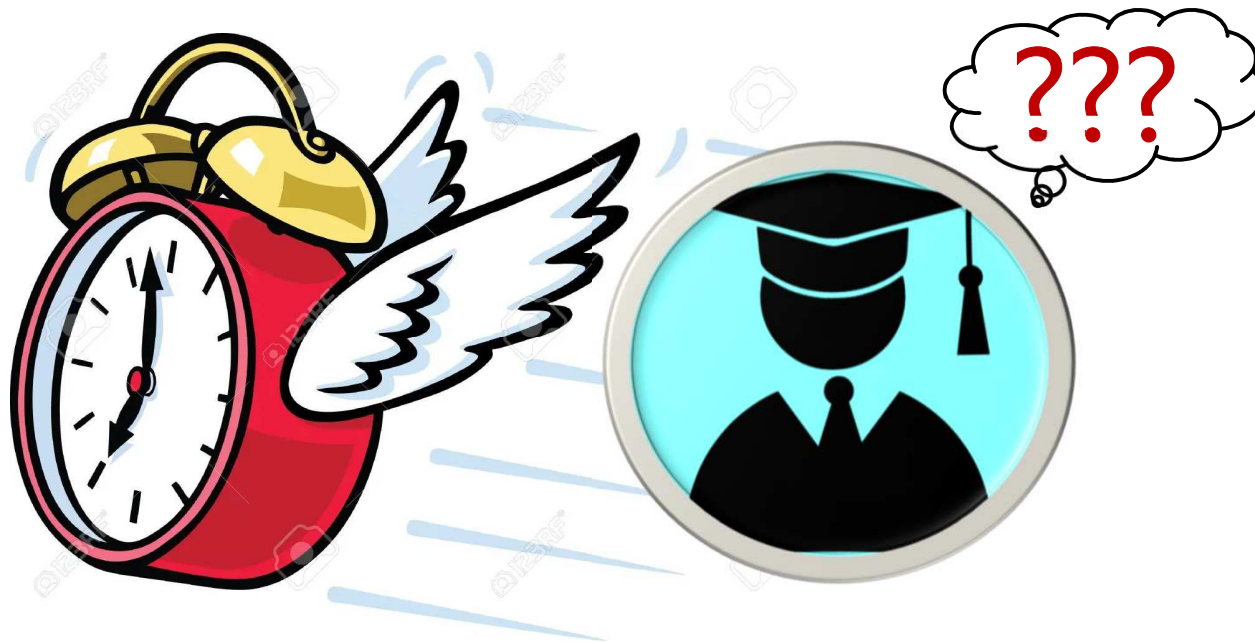
PLAN FOR CAREER PATHWAY?



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BECOMING A PROFESSIONAL ENGINEERING PERSONNEL MALAYSIAN IEM'S OB PROFESSIONAL ASSESSMENT

ACADEMIC
REQUIREMENTS

TRAINING REQUIREMENTS

PROFESSIONAL
REGISTRATION

Accredited
Engineering
Degree/Diploma
(normal route)

Relevant Working Experience
Match Against The OB
Professional Competencies

Professional
Interview/Exam

Professional
Engineering Title

ACCORDS & AGREEMENTS

The header features a dark blue background with a pattern of light blue gears, circuit lines, and mechanical components. The text 'ACCORDS & AGREEMENTS' is written in white, bold, uppercase letters on the left side of this pattern.

Educational Accords and Competence Agreements is a platform for mutual recognition of qualifications and registration for the engineering workforce amongst signatories countries.



ACCREDITED DEGREE/DIPLOMA

ACCORDS	
Washington Accord (WA)	provides for mutual recognition of programmes accredited for the engineer track
The Sydney Accord (SA)	establishes mutual recognition of accredited qualifications for engineering technologist
The Dublin Accord (DA)	provides for mutual recognition of accredited qualifications for engineering technicians

COMPETENCE AGREEMENTS

AGREEMENT	
International Professional Engineers Agreement (IPEA) APEC Engineers Agreement (APECA)	Professional Engineers
International Engineering Technologists Agreement (IETA)	Engineering Technologists
Agreement for International Engineering Technicians (AIET)	Engineering Technicians

Provide mechanisms to support the recognition of a professional registered in one signatory jurisdiction obtaining recognition in another.

PROFESSIONAL COMPETENCIES PROFILE

	Differentiating Characteristic	Professional Engineer	Engineering Technologist	Engineering Technician
1	Comprehend and apply universal knowledge: Breadth and depth of education and type of knowledge	EC1: Comprehend and apply advanced knowledge of the widely-applied principles underpinning good practice	TC1: Comprehend and apply the knowledge embodied in widely accepted and applied procedures, processes, systems or methodologies	NC1: Comprehend and apply knowledge embodied in standardized practices
2	Comprehend and apply local knowledge: Type of local knowledge	EC2: Comprehend and apply advanced knowledge of the widely-applied principles underpinning good practice specific to the jurisdiction of practice	TC2: Comprehend and apply the knowledge embodied procedures, processes, systems or methodologies that is specific to the jurisdiction of practice	NC2: Comprehend and apply knowledge embodied in standardized practices specific to the jurisdiction of practice
3	Problem analysis: Complexity of analysis	EC3: Define, investigate and analyze complex problems using data and information technologies where applicable	TC3: Identify, clarify, and analyze broadly-defined problems using the support of computing and information technologies where applicable	NC3: Identify, state and analyze well-defined problems using the support of computing and information technologies where applicable
4	Design and development of solutions: Nature of the problem and uniqueness of the solution	EC4: Design or develop solutions to complex problems considering a variety of perspectives and taking account of stakeholder views	TC4: Design or develop solutions to broadly-defined problems considering a variety of perspectives.	NC4: Design or develop solutions to well-defined problems
5	Evaluation: Type of activity	EC5: Evaluate the outcomes and impacts of complex activities	TC4: Evaluate the outcomes and impacts of broadly defined activities	NC5: Evaluate the outcomes and impacts of well-defined activities
6	Protection of society: Types of activity and responsibility to consider sustainable outcomes	EC6: Recognize the foreseeable economic, social, and environmental effects of complex activities and seek to achieve sustainable outcomes*	TC6: Recognize the foreseeable economic, social, and environmental effects of broadly-defined activities and seek to achieve sustainable outcomes*	NC6: Recognize the foreseeable economic, social, and environmental effects of well-defined activities and seek to achieve sustainable outcomes*

PROFESSIONAL COMPETENCIES PROFILE

7	Legal, regulatory, and cultural: No differentiation in this characteristic	EC7: Meet all legal, regulatory, and cultural requirements and protect public health and safety in the course of all activities	TC7: Meet all legal, regulatory, and cultural requirements and protect public health and safety in the course of all activities	NC7: Meet all legal, regulatory, and cultural requirements and protect public health and safety in the course of all activities
8	Ethics: No differentiation in this characteristic	EC8: Conduct activities ethically	TC8: Conduct activities ethically	NC8: Conduct activities ethically
9	Manage engineering activities: Types of activity	EC9: Manage part or all of one or more complex activities	TC9: Manage part or all of one or more broadly-defined activities	NC9: Manage part or all of one or more well-defined activities
10	Communication and Collaboration: Requirement for inclusive communications. No differentiation in this characteristic	EC10: Communicate and collaborate using multiple media clearly and inclusively with a broad range of stakeholders in the course of all activities	TC10: Communicate and collaborate using multiple media clearly and inclusively with a broad range of stakeholders in the course of all activities	NC10: Communicate and collaborate using multiple media clearly and inclusively with a broad range of stakeholders in the course of all activities
11	Continuing Professional Development (CPD) and Lifelong learning: Preparation for and depth of continuing learning. No differentiation in this characteristic	EC11: Undertake CPD activities to maintain and extend competences and enhance the ability to adapt to emerging technologies and the ever-changing nature of work	TC11: Undertake CPD activities to maintain and extend competences and enhance the ability to adapt to emerging technologies and the ever-changing nature of work	NC11: Undertake CPD activities to maintain and extend competences and enhance the ability to adapt to emerging technologies and the ever-changing nature of work
12	Judgement: Level of developed knowledge, and ability and judgement in relation to type of activity	EC12: Recognize complexity and assess alternatives in light of competing requirements and incomplete knowledge. Exercise sound judgement in the course of all complex activities	TC12: Choose appropriate technologies to deal with broadly defined problems. Exercise sound judgement in the course of all broadly-defined activities	NC12: Choose and apply appropriate technical expertise. Exercise sound judgement in the course of all well-defined activities
13	Responsibility for decisions: Type of activity for which responsibility is taken	EC13: Be responsible for making decisions on part or all of complex activities	TC13: Be responsible for making decisions on part or all of one or more broadly defined activities	NC13: Be responsible for making decisions on part or all of all of one or more well-defined activities

IEM'S OB PROFESSIONAL ASSESSMENT



- IEM's OB Professional Competency profile is in line with the 13 IEA Professional Competency Profile
- Document submission:
 1. Application Form
 2. Professional Competency Profile (Training and Experience Report)
 3. Technical/Project Report (Applicant's past engineering project-design calculations, specifications and drawings)
- The Professional Interview consists of two parts:
 1. The Oral Interview
 2. The Written Examination (Essay Writing)

IEM'S OB PROFESSIONAL COMPETENCY PROFILES

- The **Professional Competency Profiles** is used as a basis for assessment, to measure the outcome of practical training and development for independent practice.
- In line with the IEA Professional Competency Profiles, IEM has adopted and adapted the UK Standard for Professional Engineering Competence (UK-SPEC) for Chartered Engineers as the reference standard for its professional competence assessment.

IEM'S PROFESSIONAL COMPETENCY PROFILES

A – Knowledge and Understanding

B – Design & Development of Process, System, Service & Product

C – Responsibilities, Management and Leadership

D – Communication and Inter-personal Skills

E – Professional Commitment

COMPETENCY CATEGORY A



A Use a combination of general and specialist engineering knowledge and understanding as a basis for optimising the application of existing and emerging technology.

A1 Maintain and extend personal knowledge, understanding and technical skills in own and allied fields of specialisation.

A2 Learn and broaden personal knowledge and experience in the technology, products or services related to own specialisation, preferably with a view to improvement.

A3 Comprehend and apply knowledge and understanding of the relevant engineering codes, standards, specifications, applications, especially those appropriate to local context, requirements, and application.

COMPETENCY CATEGORY B



B Apply appropriate theoretical and practical methods to the analysis and solution of engineering problems

B1 Identify projects and/or opportunities/problems

B2 Conduct appropriate research and undertake design and development of engineering solutions.

B3 Implement design solutions, and evaluate their effectiveness.

COMPETENCY CATEGORY C



- C Provide technical and commercial management.
- C1 Plan for effective project or job task implementation.
- C2 Plan, budget, organise, direct and control tasks, people and resources.
- C3 Lead teams and develop staff to meet changing technical and/or managerial needs.
- C4 Bring about continuous improvement through quality management.

COMPETENCY CATEGORY D



D Demonstrate effective interpersonal skills

D1 Communicate in National or English Language with others at all levels.

D2 Present and discuss proposals.

D3 Demonstrate personal and social skills

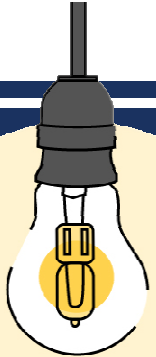
COMPETENCY CATEGORY E



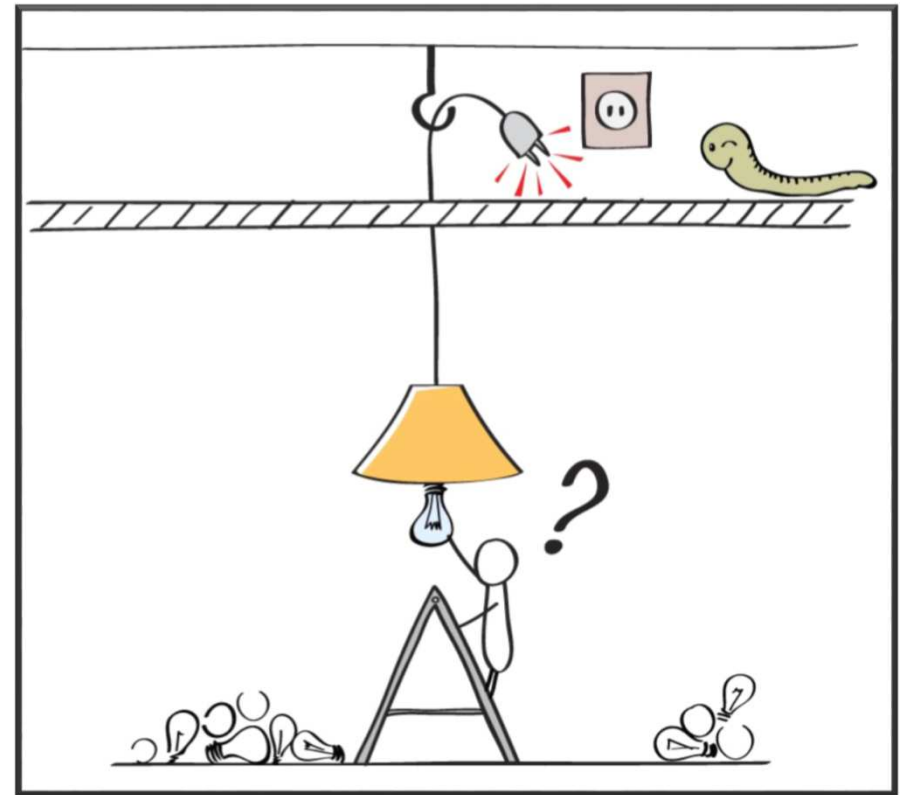
- E Demonstrate a personal commitment to professional standards, recognizing obligations to society, the profession and the environment
- E1 Comply with relevant codes of conduct.
- E2 Manage and apply safe systems of work.
- E3 Undertake engineering activities in a way that contributes to sustainable development.
- E4 Carry out and record continuing professional development (CPD) necessary to maintain and enhance competence in own area of practice.
- E5 Understand the legal matters pertaining to engineering profession.



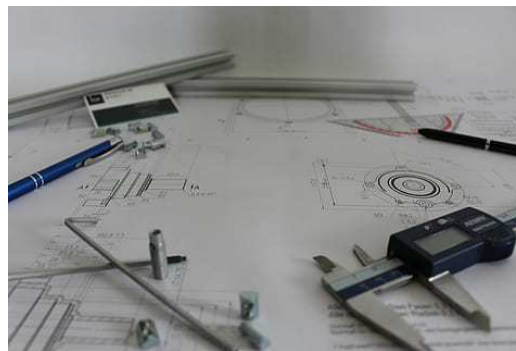
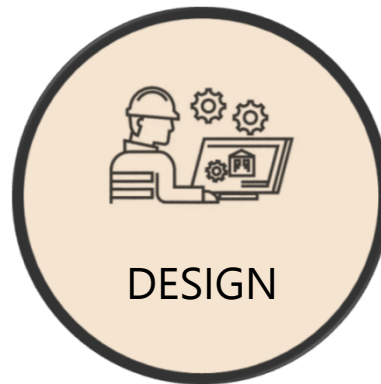
How the Outcome-based Competence Assessment helps you as an engineering graduate



“Understanding Your Problem Is Half The Solution (The Most Important Half)”



CONSULTANCY- ENGINEER A



CONTRACTOR-ENGINEER B



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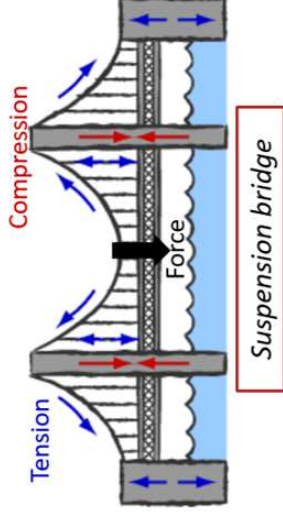
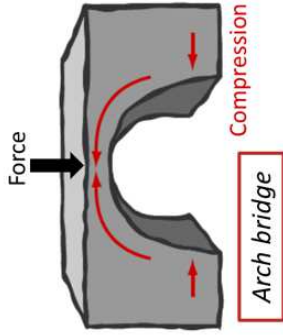
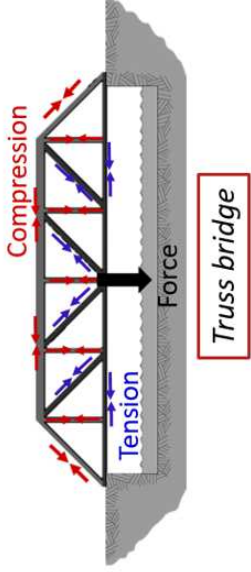
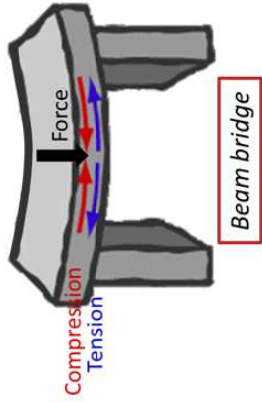


CHALLENGES



A – KNOWLEDGE AND UNDERSTANDING

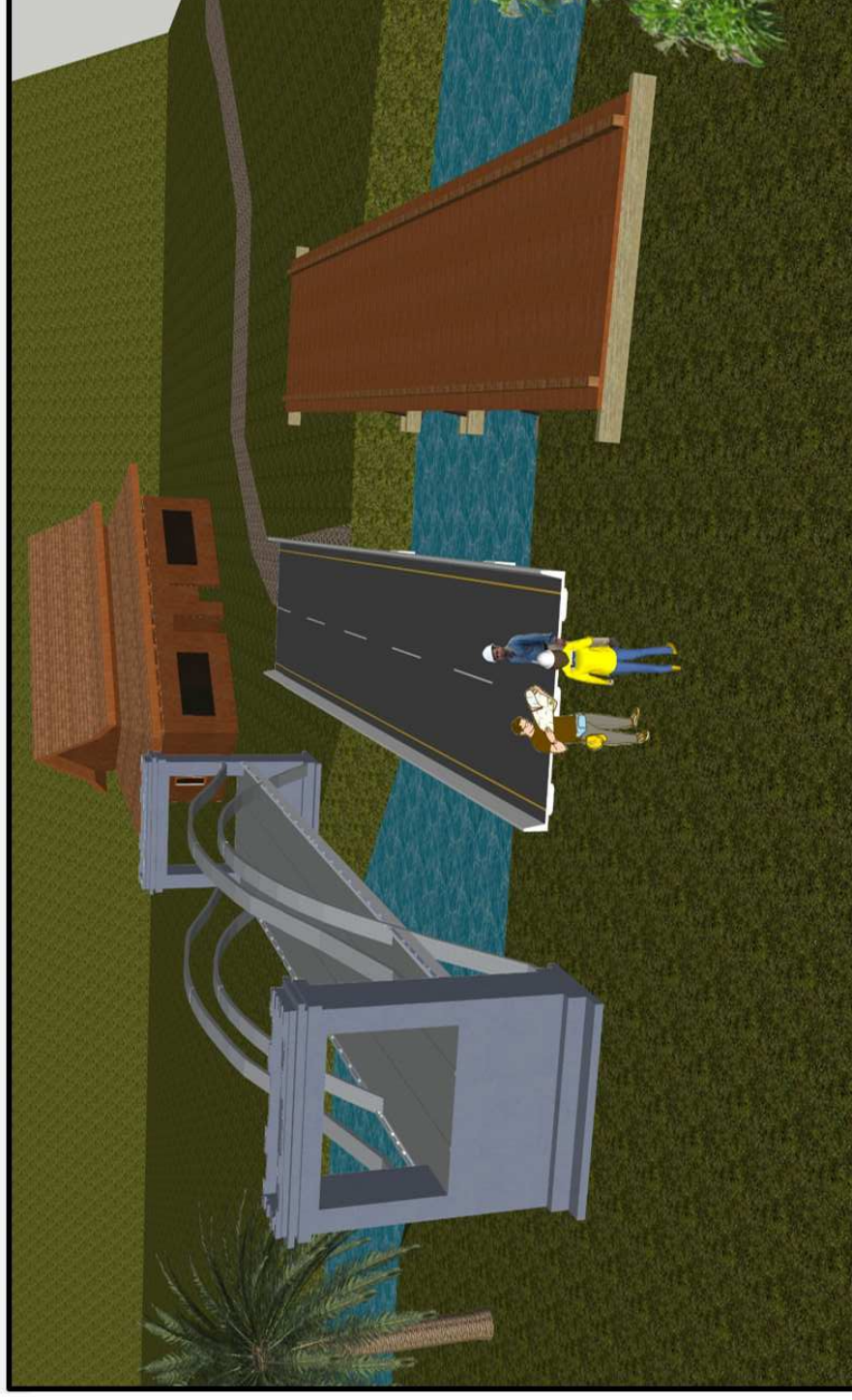
THEORY



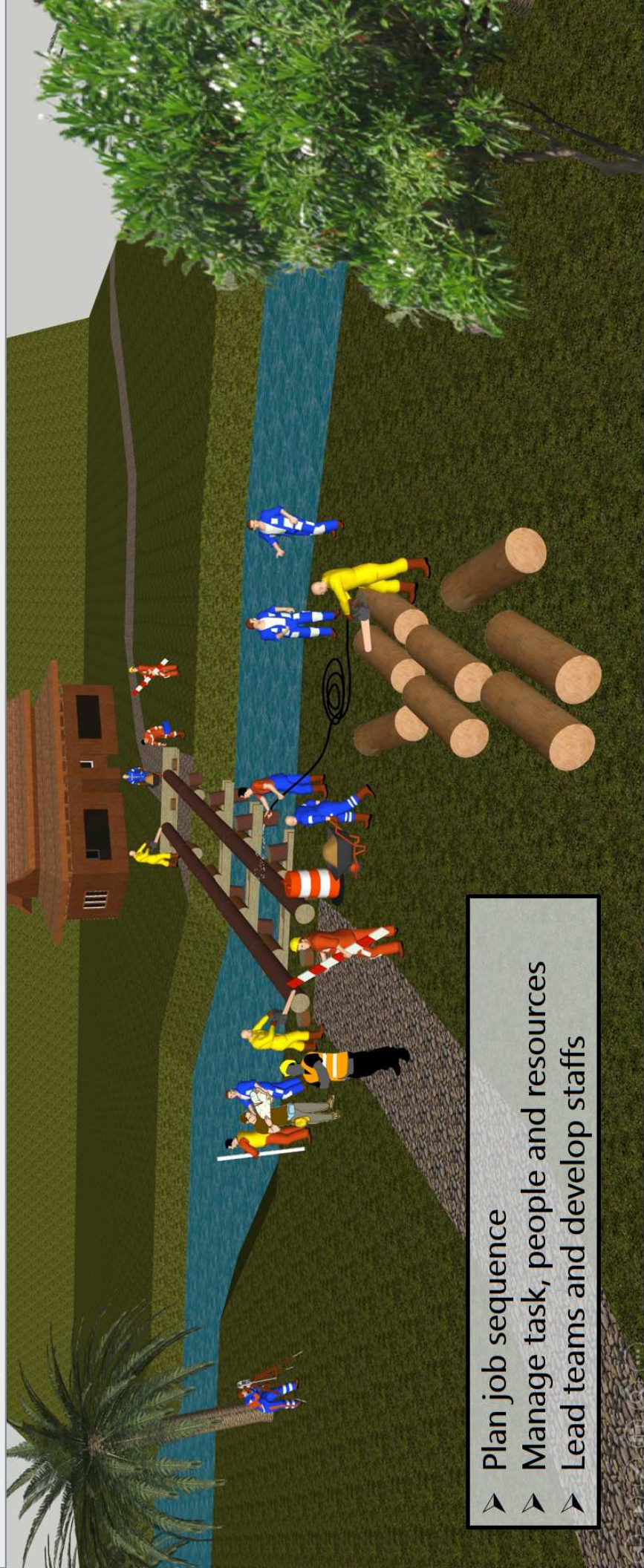
B – DESIGN AND DEVELOPMENT OF PROCESS, SYSTEM, SERVICE AND PRODUCT

DESIGN ELEMENTS

- **Type of bridge**
*Beam? Truss? Arch?
Suspension? Cable-stayed?*
- **Materials**
Wood? Concrete? Steel?
- **Loading**
Traffic? Pedestrian? Wind?
- **Span details**
Simple? Continuous? Cantilever?
- **Others**
Limitations?

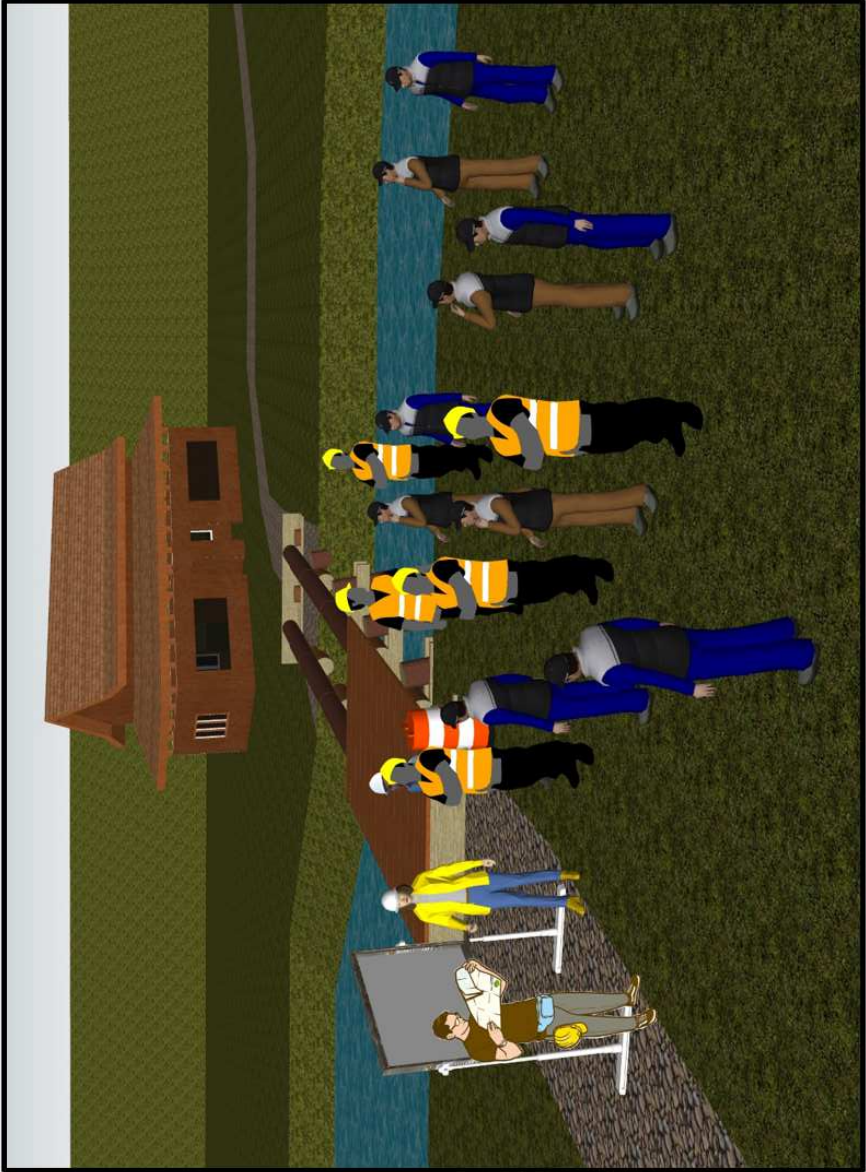


C – RESPONSIBILITIES, MANAGEMENT AND LEADERSHIP



- Plan job sequence
- Manage task, people and resources
- Lead teams and develop staffs

D – COMMUNICATION AND INTER-PERSONAL SKILLS



Communication



Give instruction that can be understood by others at all levels

Social skills



Demonstrate personal and social skills

E – PROFESSIONAL COMMITMENT

- 1) **Ethics**
 - Comply with relevant codes of conduct
- 2) **Safety**
 - Apply safe system of work
- 3) **Sustainability**
 - Ensure activities contribute to sustainability development
- 4) **Continuous learning**
 - Carry out and record continuing professional development (CPD)
- 5) **Legal**
 - Understand legal matters regarding engineering





THANK YOU

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