

THE HONG KONG INSTITUTION OF ENGINEERS
THE HKIE FORMAL TRAINING SCHEMES
(SCHEME “A” GRADUATE TRAINING AND AM TRAINING)

1. INTRODUCTION

The HKIE is a professional engineering institution. It has a direct responsibility to its members and to society to ensure the proper levels of entry and practising standards for its membership.

In 1983 the HKIE gave a lead to local industry by providing a structured training scheme, the HKIE Scheme “A” Graduate Training (Scheme “A”), which is considered an important stage in the development of a graduate in achieving the goal of becoming a professional engineer. Scheme “A” is available for all Disciplines within the HKIE and operates in different companies and organisations. It is well-recognised, and is designed as a faster track for a graduate to obtain full HKIE professional status.

On the other hand, Formal Training Scheme to Associate Membership (AM Training) was launched for Building Services, Civil and Manufacturing, Industrial and Systems Engineering (then Manufacturing and Industrial Engineering) disciplines in 2004, and Building, Electrical and Mechanical were later included.

The HKIE believes that an engineer can best develop the qualities that he or she requires by integrating theoretical knowledge and practical skills. The training schemes therefore serves as a transitional period from an academic environment to real life industry by providing trainees with the opportunity to achieve this necessary integration with practice.

For Scheme “A”, the HKIE adopted the ‘Training-by-Objectives’ method around 1995: trainees were considered to have completed their Scheme “A” training by achieving all the objectives in their companies’ training programmes at the desired levels. From 1 April 2019, all new Scheme “A” trainees have adopted the competence-based approach. This is essentially the same as the previous ‘Training-by-Objectives’ except that the objectives are now written as ‘Training Outcomes’, and are aligned to the HKIE’s competence standards. Trainees need to (i) complete training records, and (ii) meet Continuing Professional Development requirements to supplement their knowledge.

AM Training in competence-based format would be applicable to trainees with training start date on or after 1 April 2022.

Scheme “A” and AM Training are supported and monitored by the Training & Development Section of the HKIE.

2. DEFINITION OF A PROFESSIONAL ENGINEER AND AN ASSOCIATE MEMBER

A Professional Engineer

The HKIE has adopted the following definition of a professional engineer used by the Conference of Engineering Societies of Western Europe and the United States of America (EUSEC) for the class of Member:

“A professional engineer is competent by virtue of his fundamental education and training to apply the scientific method and outlook to the analysis and solution of engineering problems. He is able to assume personal responsibility for the development and application of engineering science and knowledge, notably in research, designing, construction, manufacturing, superintending, managing and in the education of other engineers. His work is predominantly intellectual and varied, and not of a routine mental or physical character. It requires the exercise of original thought and judgement and the ability to supervise the technical and administrative work of others.

His education will have been such as to make him capable of closely and continuously following progress in his branch of engineering science by consulting newly published works on a world-wide basis, assimilating such information and applying it independently. He is thus placed in a position to make contributions to the development of engineering science or its applications.

His education and training will have been such that he will have acquired a broad and general appreciation of the engineering sciences as well as a thorough insight into the special features of his own branch of engineering. In due time he will be able to give authoritative technical advice and to assume responsibility for the direction of important tasks in his branch.”

The following competences (in four broad areas, namely Applying Engineering Knowledge, Developing Technical Solutions, Managing Engineering Work and Upkeeping Professional Acumen) set the standard expected for engineers seeking professional recognition as Corporate Members by undertaking a competence-based assessment administered by the HKIE. In addition to the twelve elements of the competence standard listed below, written communication skills are required.

1. Comprehend and apply knowledge of accepted principles underpinning widely applied good practice for professional engineering.
2. Comprehend and apply knowledge of accepted principles underpinning good practice for professional engineering that is specific to Hong Kong.
3. Define, investigate and analyse complex engineering problems in accordance with good practice for professional engineering.
4. Design or develop solutions to complex engineering problems in accordance with good practice for professional engineering.
5. Be responsible for making decisions on part or all of one or more complex engineering activities.
6. Manage part or all of one or more complex engineering activities in accordance with good engineering management practice.

7. Identify, assess and manage engineering risk.
8. Conduct engineering activities to an ethical standard prescribed by the HKIE.
9. Recognise the reasonably foreseeable social, cultural, health, safety, sustainability and environmental effects of professional engineering activities generally.
10. Communicate clearly with other engineers and others that he or she is likely to deal with in the course of his or her professional engineering activities.
11. Maintain the currency of his or her professional engineering knowledge and skills.
12. Exercise sound professional engineering judgement.

An Associate Member

A definition of an Associate Member used by the Conference of Engineering Societies of Western Europe and the United States, was adopted by the HKIE for the class of Associate Member:

“An Associate Member is one who can apply in a responsible manner proven techniques which are commonly understood by those who are expert in a branch of engineering, or those techniques specially prescribed by professional engineers.

“Under general professional engineering direction, or following established engineering techniques, he is capable of carrying out duties which may be found among the list of examples set out below.

“In carrying out many of these duties, competent supervision of the work of skilled craftsmen will be necessary. The techniques employed demand acquired experience and knowledge of a particular branch of engineering, combined with the ability to work out the details of a task in the light of well-established practice.

“An Associate Member requires an education and training sufficient to enable him to understand the reasons for and purpose of the operations for which he is responsible.

“The following duties are typical of those carried out by Associate Members under the conditions referred to above.

“Working on design and development of engineering plant and structures: erecting and commissioning of engineering equipment and structure; engineering drawing; estimating, inspecting and testing engineering construction and equipment; use of surveying instruments; operating, maintaining and repairing engineering machinery, plant and engineering services and locating defects therein; activities connected with research and development, testing of materials and components and sales engineering, servicing equipment and advising consumers.”

The following competences (also in four broad areas, namely Applying Engineering Knowledge, Developing Technical Solutions, Managing Engineering Work and Upkeeping Professional Acumen) set the standard expected of an

Associate Member of the HKIE.

1. Comprehend and apply knowledge of widely accepted and applied procedures, processes, systems or methodologies;
2. Comprehend and apply knowledge of widely accepted and applied procedures, processes, systems or methodologies that is specific to Hong Kong;
3. Identify, clarify and analyse broadly-defined engineering problems in accordance with good practice for engineering;
4. Design or develop solutions to broadly-defined engineering problems in accordance with good practice for engineering;
5. Be responsible for making recommendations and/or decisions on part or all of one or more broadly-defined engineering activities;
6. Organise engineering activities;
7. Identify and assess engineering risk;
8. Conduct engineering activities to an ethical standard prescribed by the HKIE;
9. Recognise the reasonably foreseeable social, cultural, health, safety, sustainability and environmental effects of broadly-defined engineering activities generally;
10. Communicate clearly and effectively on broadly-defined engineering activities with members of an engineering team;
11. Maintain the currency of engineering knowledge and skills;
12. Exercise sound judgement in the course of broadly-defined engineering activities.

3. ORGANISATIONAL STRUCTURE & PROCEDURES

The Training Committee (TC) is responsible for all policy and procedural matters related to the HKIE Scheme “A” Graduate Training and AM Training. It discusses, endorses and approves all training related matters, and reports to the Qualification and Membership (Q&M) Board. It is supported by three Training Review Sub-Committees (TRSCs).

3.1 Training Committee Structure

The TC is composed of one representative per Discipline, who is nominated by individual Discipline Advisory Panels and other ex-officio members. It is responsible for all matters relating to the training schemes regulated by the HKIE. It holds regular meetings to discuss and approve training matters such as discipline matching, Engineering Supervisors applications, and the status of companies and trainees.

3.2 Training Review Sub-Committee

The TRSCs are sub-committees of the Training Committee and each Discipline has representatives in one of these three TRSCs. TRSC members are experienced Corporate Members with an interest in training, selected by their Discipline Advisory Panels as Experts in their field. One representative from Associate Members Committee (AMC) is also nominated in each of the TRSC. They assist in (i) the assessment and re-assessment of organisations applying to provide Scheme “A” / AM

Training, and (ii) matters relating to trainee training arrangements, including secondment, extensions, exemption etc.

4. AIMS & PHILOSOPHY

4.1 Aims

The overall aim of the training schemes is to enable trainees to develop the qualities that an engineer requires in the following areas:

- a) Applying Engineering Knowledge
- b) Developing Technical Solutions
- c) Managing Engineering Work
- d) Upkeeping Professional Acumen

The training schemes are designed to ensure that young engineers can undertake engineering projects with proper regard for the technical, economic, financial, environmental and social factors involved when they progress in their career development.

4.2 Philosophy

Scheme “A” and AM Training are intended to be “hands-on” and “learn-by-experience”. It is based on the belief that this period is a natural progression in a trainee’s education, putting theory into practice, and enhancing previous academic studies through the learning opportunities provided by real-life activities.

Training experiences should be relevant to the trainee’s discipline and at the right level. Trainees are considered to learn best when they are practically and personally involved in their prescribed training activities. Real work helps ensure that the training experiences are relevant and that the trainees quickly become an active part of the production process within the company. Therefore, there should always be a careful balance between commercial interests and training needs.

5. STRUCTURE OF SCHEME “A” / AM TRAINING

Scheme “A” and AM Training enable trainees to become proficient in their chosen profession, by acquiring knowledge or skills by study, observation, information retrieval, instruction, and experience.

To achieve the training aims, the input and dedication of three partners: the Company, the HKIE, and the trainees, under a well-structured training scheme, are necessary.

5.1 The Partners

Training success depends on equal input from three parties. Each carries their own responsibilities.

5.1.1 The Company

The Company provides the training opportunities, designates staff for various duties of the training schemes, and provides Continuing Professional Development (CPD) support. The Company is a key factor in achieving the training aims as the training schemes depend on the Company providing suitable training opportunities to support the training required by an engineering graduate. The Company also designates qualified and suitable Engineering Supervisors and Training Tutors to closely supervise trainees' development according to the approved training programme.

Many companies offer in-house courses for their staff to support CPD. A company may provide financial and time support for trainees to attend external CPD courses to fulfil relevant requirements.

5.1.2 The HKIE

The HKIE sets policy, and coordinates and monitors training with respect to companies and trainees. The success of Scheme "A" and AM Training owes much to the camaraderie that exists within the engineering disciplines and members' readiness to help with the training schemes.

The HKIE's role is to:

- (i) promote and instigate policies related to Scheme "A" and AM Training and the interests of graduate trainees;
- (ii) liaise with local universities, institutes and Discipline Advisory Panels on discipline matching for accredited academic qualifications for assessment of eligibility to register into relevant training schemes;
- (iii) carry out the assessment procedures leading to approval of Scheme "A" / AM Training companies;
- (iv) train staff from companies to become Engineering Supervisors for the training schemes;
- (v) carry out re-assessment procedures for approved companies;
- (vi) regularly review training requirements to ensure training suits industry needs;
- (vii) register trainees and handle related requests during their training period;
- (viii) maintain all active records related to companies and trainees;
- (ix) issue certificates; and
- (x) publish and maintain all documents related to scheme training.

5.1.3 The Trainees

The trainees are expected to make the most of the learning opportunities implicit in the training offered by their company to ensure that their knowledge and skills are up to the required standards. They should demonstrate a positive attitude by displaying interest, enthusiasm, and curiosity towards matters around them. They should be committed to their work and self-motivated to learn. As engineers seldom work alone, trainees should also learn to work within a team and be courteous to all levels of staff around them.

At the professional/associate membership level, how the trainees benefit from the scheme relies very much on their enthusiasm, curiosity, observation, use of logic, intellect, analytical skills etc. They should try their best to learn from real life situations, identify any problems encountered and help solve them. Trainees should be part of the company's productive process and their contribution is expected to increase as they become more experienced and capable of handling matters independently.

5.2 **The Training Programme**

The Training Programme is prepared by the Company based on HKIE guidelines to meet the scheme requirements. The training period is normally two years or three years, based on how long trainees need to achieve the outcomes expected at the end of the training period. The Engineering Supervisors, as the *de facto* representatives of the HKIE, ensure that the programme meets the requirements and is carried out properly in the Company. The trainees should follow the approved training programme, attend CPD activities and keep appropriate records as part of the requirements. The Engineering Supervisors should also be responsible for regularly monitoring and assessing trainees' progress throughout the training period.

The Company, the HKIE and the trainee sign on Form TD2 as a training agreement in which each party agrees to the terms of the training schemes. Therefore, it is important to consider carefully before signing the agreement. The trainee should note that the HKIE discourages resignations during the training period, and does not normally approve changing company or discipline unless good reasons exist.

6. **BENEFITS**

The training schemes benefit both trainees and employers.

Trainees: Scheme "A"/AM Training is a golden opportunity to follow a systematic graduate level in-company training programme designed for a trainee's chosen discipline in the engineering profession.

Employers: Being an approved company in Scheme "A" or AM Training makes a company attractive to graduates and is a symbol of commitment to social

responsibility. A company can use its training scheme to groom its future supervisory and management staff for career development and succession planning purposes.

7. VOCATIONAL TRAINING COUNCIL (VTC)

The VTC co-operates closely with the HKIE and recognises Scheme “A” training for subsidy purposes (up to 18 months). The purpose of the VTC-administered subsidy is to supplement the costs incurred by the company in providing structured training. Government departments are not eligible for the subsidy, and the subsidy is available for Scheme “A” trainees only.

8. HKIE TRAINING & DEVELOPMENT SECTION

The main duties of the HKIE Training & Development Section include administrative matters related to the Scheme “A” Graduate Training, Formal Training Scheme to Associate Membership and Continuing Professional Development. The Section provides support to the Training Committee, the Training Review Sub-Committees and the Continuing Professional Development Committee, which handle all matters related to training and CPD. For enquiries, please contact the Training & Development Section at (852) 2890 6373 or at train@hkie.org.hk.