



HANDBOOK ON

LIBERALISATION OF PROFESSIONAL SERVICES
THROUGH MUTUAL RECOGNITION IN ASEAN:

ENGINEERING SERVICES



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one identity
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ENGINEERING SERVICES

The ASEAN Secretariat
Jakarta

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DISCLAIMER

This publication was developed with the intention of facilitating the understanding of the liberalisation of professional services through mutual recognition agreements in ASEAN. The publication does not reflect the views of the Parties to the Agreement (ASEAN Member States), the ASEAN Secretariat or AADCP II. As a Handbook, it does not form part of the agreements and does not provide or intend to provide any legal interpretation of the agreements. Neither the ASEAN Secretariat nor AADCP II accepts any liability for any claims, loss or expenses that may arise from the use of information in this publication. To ease understanding, some examples have been provided but these are mere illustrations and do not provide judgment nor constitute commercial advice. Views or conclusions may have also been expressed but these should not be taken as legal or commercial advice.

The information in this Handbook is as of 31 December 2014.

01.

INTRODUCTION

The Handbook “LIBERALISATION OF PROFESSIONAL SERVICES THROUGH MUTUAL RECOGNITION IN ASEAN: ENGINEERING SERVICES” is one of four Handbooks published by the ASEAN Secretariat to provide guidance on the liberalisation of professional services in ASEAN. Three other Handbooks in this series deal respectively with the accountancy, architecture and surveying professions.

The Handbook is an important tool to disseminate information and create greater understanding of the liberalisation of the trade in engineering services within ASEAN.

Through the Handbook, ASEAN engineering professionals will be able to obtain information on how to qualify and practice as an engineer, either as an employee, through collaborations or through the setting-up of commercial presence, in all ASEAN Member States (AMS).

The ability of engineers to move beyond national borders within ASEAN will assist ASEAN to accelerate the objective of the ASEAN Economic Community (AEC) in 2015. Under the AEC, the ability of engineers to provide services beyond national borders is facilitated by the ASEAN Framework Agreement on Trade in Services (AFAS) 1995¹ and the Mutual Recognition Agreement (MRA) on Engineering Services 2005. The MRA is one of the important tools to increase the level of liberalisation of cross-border trade in engineering services in ASEAN.

AFAS, which adopts the core structure and substantive provisions of the General Agreement on Trade in Services (GATS) of the World Trade Organisation (WTO), defines cross-border trade in services as consisting of four modes of supply depending on the territorial presence of the supplier and the consumer at the time of the transaction.

Pursuant to Article I:2 of GATS, the four modes of supply of services featured under AFAS are:

- a. from the territory of one Member into the territory of any other Member (Mode 1 - Cross border trade);
- b. in the territory of one Member to the service consumer of any other Member (Mode 2 – Consumption abroad);
- c. by a service supplier of one Member, through commercial presence, in the territory of any other Member (Mode 3 - Commercial presence); and
- d. by a service supplier of one Member, through the presence of natural persons of a Member in the territory of any other Member (Mode 4 - Presence of natural persons).

¹ As the main legal document facilitating the liberalisation of trade in services among AMS, AFAS aims to (1) enhance cooperation in services among AMS; (2) improve the efficiency and competitiveness of ASEAN services industries, diversify production capacity and supply, and distribution of services; (3) eliminate substantial barriers to trade in services; and (4) liberalise trade in services by expanding the depth and scope of liberalisation beyond those undertaken under the General Agreement on Trade in Services (GATS) of the World Trade Organisation (WTO).

Box 1: Examples of Four Modes of Supply

Mode 1: Cross border

A user in country A receives services from abroad through its telecommunications or postal infrastructure. Such supplies may include consultancy or engineering drawings.

Mode 2: Consumption abroad

Nationals of country A go abroad as tourists, students, patients or clients to consume services delivered in country B.

Mode 3: Commercial presence

The service is provided within country A by a locally-established affiliate, subsidiary, or representative office of a foreign-owned company.

Mode 4: Movement of natural persons

A foreign national provides a service within country A on a temporary basis as an independent supplier (e.g., consultant) or employee of a service supplier (e.g. consultancy firm, construction company).

Commercial linkages may exist among all four modes of supply. For example, a foreign company established under mode 3 in country A may employ nationals from country B (mode 4) to export services cross-border into countries B, C etc.

Box 1: Four Modes of Services

To facilitate the movement of individual professional service providers (natural persons) from one AMS to another, AMS entered into the ASEAN Agreement of the Movement of Natural Persons (MNP Agreement) signed on 19 November 2012 in Cambodia.

The MNP Agreement covers temporary entry of skilled workers, professionals and executives. The scope of the MNP Agreement is limited to business visitors, intra-corporate transferees, and contractual service suppliers and is subject to the commitments made in the Schedule of Commitments of individual AMS. The MNP Agreement does not cover professional service providers who seek permanent access to the labour market of another AMS.

The Handbook is arranged in the following manner. Part 2 of the Handbook discusses the definition of mutual recognition and MRAs, models of mutual recognition and MRAs in several jurisdictions, and international and regional MRAs on engineering services.

Part 3 of the Handbook provides an overview of the requirements to qualify as an engineer, to set-up an engineering practice and requirements for foreigners to qualify and practice as engineers in all AMS.

Part 4 analyses various issues surrounding the liberalisation of engineering services in ASEAN, with particular attention on the setting-up of engineering firms or commercial presence and employment and movement of foreign engineers.

Part 5 of the Handbook provides several proposals for reform of the liberalisation of engineering services in ASEAN and offers a few concluding thoughts.

02.

**MUTUAL RECOGNITION
IN THE ENGINEERING
PROFESSION**

2.1. Defining MRAs

An important element of the liberalisation of engineering services is the ability of qualified engineering professionals from one jurisdiction (home country) to practice in another jurisdiction (host country). The ability to practice in different jurisdictions may be achieved through several means. These may include the unilateral recognition of qualifications and experience, the harmonisation of qualifications and the mutual recognition of qualifications and experience.

Mutual recognition agreements are contractual arrangements subject to which countries, standards agencies or professional organisations (e.g. licensing bodies) agree to recognise the equivalence of another country's technical regulations (or conformity assessment procedures)², sanitary or phytosanitary measures³ or, in the case of natural persons, their academic or professional qualifications such as the ASEAN Mutual Recognition Agreements on Engineering, Architecture or Accountancy services. Thus MRAs are trade-facilitative instruments negotiated and concluded - often in support of market access commitments - that reduce the costs and time that would otherwise be required to obtain product approvals or certification of professional qualifications.

As a practical matter, MRAs establish the conditions subject to which a body of foreign rules and requirements and the procedures for verifying compliance with them will be recognised as equivalent by the parties to the agreement, for the purpose of assuring market regulators and consumers in the importing (host) country that imported products or service suppliers from another MRA signatory are safe or meet accepted minimum expectations in terms of integrity and quality.

The exporters of such goods and services benefit from the conditional recognition such MRAs provide, while market regulators in the importing state essentially agree to forego any further testing or impose additional compliance requirements on the imported goods' or foreign service suppliers.

Put another way, MRAs are the means by which one derogates from the "when in Rome, do as the Romans" principle so that producers and service suppliers do not need to comply with the technical regulations and professional qualification requirements of the country to which they wish to export or provide their services respectively.⁴

With the long-established trend of a shift in the incidence of market access barriers from border measures (such as tariffs and quotas) to behind the border policies (particularly domestic regulation), mutual recognition is increasingly viewed as an important corollary to trade and investment liberalisation in the absence of regulatory harmonisation or marked regulatory convergence. In the wake both of the creation of the WTO's General Agreement on Trade in Services (GATS) and, more importantly still, the post-Uruguay Round explosion of preferential trade agreements concluded at the bilateral and regional levels, MRAs have become an established, albeit arguably still largely underused, instrument of market integration in today's trade policy landscape.

MRAs serve as a substitute for full-blown regulatory harmonisation, allowing for market access commitments to be operationalised for the covered goods and services while preserving "regulatory

² See for example the Agreement between the European Community and the United States of America on the Mutual Recognition of Certificates of Conformity for Marine Equipment, available at <http://lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:150:0042:0086:EN:PDF> (visited on 15 March 2014).

³ See for example Art. 4.2 of the WTO Agreement on Sanitary and Phytosanitary Measures which states "Members shall, upon request, enter into consultations with the aim of achieving bilateral and multilateral agreements on recognition of the equivalence of specified sanitary and phytosanitary measures".

⁴ Nicolaidis, K. A., & Shaffer, G. (2005). Managed Mutual Recognition Regimes: Governance Without Global Government. *Law and Contemporary Problems*, 3.

diversity” and allowing different governments to achieve various policy objectives in accordance with their own priorities and policy objectives.⁵ Concluding an MRA does not necessarily imply that the regulations that apply to products or service suppliers (natural persons practicing regulated professions) are to be brought into explicit alignment either upon conclusion of the agreement or at any time in the future, but that instead, the products and service suppliers of the other party or parties to the MRA will be deemed equivalent to the goods or service suppliers of national (domestic) origin.

This section of the Handbook discusses the various issues that arise in connection with MRAs concluded for the purpose of facilitating the free movement of natural persons providing professional services. It also takes up a number of political economy considerations and domestic regulatory frameworks that inevitably create the need for a policy instrument able to fulfill the functions performed by MRAs.

2.1.1. Trade Barriers Affecting the Movement of Natural Persons

MRAs represent a means to reduce the cost of entry into foreign services markets by releasing foreign service suppliers from the - often onerous - burden of re-qualifying in the target market (by meeting additional educational or training requirements) as well as facilitating the means by which they can produce evidence confirming that they fulfill licensing and qualification requirements in the host country market. MRAs are thus a way to reduce transaction costs and represent a flanking measure necessary to operationalise market access commitments usually made in the context of a broader economic integration initiative or drive towards greater trade and investment liberalisation.

Access to many services markets, particularly for foreign service suppliers, is conditioned by policy interventions that are often taken by domestic regulators having little regard for - or even awareness of - the market access implications of their actions, particularly since such regulators will typically be motivated by a wholly different set of policy objectives than those pertaining to trade liberalisation.

In terms of measures impeding the ability of natural persons to provide their services abroad, some of the most common barriers are constituted by immigration or labour market restrictions or a failure by domestic regulatory bodies to recognise, in part or in full, the academic qualifications or professional accreditation of the foreign service supplier in question. Nationality or residency requirements may equally inhibit cross-border trade in professional services, as do measures that restrict the eligibility of service suppliers to contest public tenders (government procurement contracts).⁶ Many of these restrictions stem from concerns by market regulators to protect consumers or achieve other societal or ethical objectives, and will often be rooted in prevailing information asymmetries between suppliers and consumers.

2.1.2. Regulated Professions and Professional Licensing

The core concept underlying MRAs governing the movement of natural persons and their economic freedom to practice their professions (provide services) in a country other than the

⁵ Maur, J.-C., & Chauffour, J.-P. (2011). Beyond Market Access. In J.-C. Maur, & J.-P. Chauffour, *Preferential Trade Agreement Policies for Development: A Handbook* (pp. 17-36). The International Bank for Reconstruction and Development / The World Bank, 26.

⁶ Hurford, K. (2003). *Going Global: The case for enhancing global trade in professional services*. Engineers Australia, 13.

one in which they obtained their qualifications, is the concept of professional licensing. By the same token it is important to recall that not all professions are licensed or subject to regulatory oversight. The extent and societal implications of information asymmetries between service suppliers and consumers play an important role in determining whether a given profession is likely to be licensed or regulated; the idea being that for professions involving a high level of technical complexity, it is essential that some form of organisation operate to certify practitioners who meet minimum standards in terms of theoretical knowledge and practical expertise (the most obvious and commonly cited examples of which are the medical and legal professions), because left to themselves consumers would not otherwise be able to distinguish between good and bad practitioners and the cost (and time) involved in amassing the information required to make such a distinction would be excessive.⁷

Regulated professions are generally distinguished from other forms of professional activity in that they tend to be predicated on a very specific body of intellectual knowledge, usually obtained by means of completing a tertiary academic (or vocational) degree, which is then reinforced with one or more years of practical experience - often as a trainee and under the supervision of a more senior qualified professional - before one is finally certified to practice the profession independently and under one's own liability - i.e. essentially given a license to offer these services on one's own account.

Regulated professions generally have an established path to accreditation that all persons wishing to practice must complete, with admission to the profession (and thus such accreditation) generally administered by a licensing body or professional association to whom powers to regulate the profession have been delegated by the State in pursuit of a generally perceived public interest, or in order to maintain a given set of professional and ethical standards. The range of accredited professions was historically quite narrow, encompassing medicine and law in most countries. The range of regulated professions has grown in conjunction with the observable trends of increased labour-market complexity and specialisation.

There are also a limited number of professions that are generally accredited or regulated across a broad swathe of countries, in such fields as law, accountancy, engineering, surveying, health care, and architecture to name just a few, while other countries leave some professions unregulated where others have recently (i.e. in the last few decades) established licensing or at least regulatory oversight, such as for asset managers, social workers, urban planners or even taxi drivers.⁸ Boiled down to its essence, licensing a profession essentially limits access to anyone not duly authorised to practice it. This may have the effect of limiting supply and thereby lead to upward pressure on prices for the services in question. In turn, this may also create an interest by those already admitted to practice the profession in question to "capture" the licensing agency or process with a view to making admission relatively onerous for new entrants in order to further limit supply. It is precisely for this reason that professional licensing has come under increasing scrutiny when administered in a way that is potentially anti-competitive or protectionist.

The above discussion highlights some of the tensions that are inherent to the process of professional licensing and which involve a balancing act between achieving those legitimate public policy objectives for which licensing was established and the desire to

⁷ See in particular Mavroidis, P. C., & Marchetti, J. A. (2012). I now recognise you (and only you) as equal: an anatomy of (mutual) recognition agreements in the GATS. In I. Lianos, & O. Odudu, *Regulating Trade in Services in the EU and the WTO, Trust, Distrust and Economic Integration* (pp. 415-444). Cambridge University Press.

⁸ Some of these examples are taken from Mavroidis, P. C., & Marchetti, J. A. (2012). I now recognise you (and only you) as equal: an anatomy of (mutual) recognition agreements in the GATS. In I. Lianos, & O. Odudu, *Regulating Trade in Services in the EU and the WTO, Trust, Distrust and Economic Integration* (pp. 415-444). Cambridge University Press.

maintain competitive, open and affordable services markets. Looked at from a trade policy perspective, this is clearly an area where foreign service supply can play an important role, and where MRAs become key policy instruments, in resolving the above tensions.

2.1.3. Trade Rules and MRAs

Rules governing MRAs are addressed by GATS Art. VII (Recognition), which sets out a number of substantive rights and obligations that WTO Members must follow when conferring recognition, whether such recognition is granted autonomously or arises in the context of reciprocal MRAs. One important dimension of Article VII is that it is situated in Part II of the GATS, entitled General Obligations and Disciplines. This means that the rights and obligations under Article VII apply to all WTO Members regardless of whether or not they have scheduled specific commitments in any given (professional) service sector. Equally important is the fact that Article VII constitutes an agreed exception from the GATS' most favored nation treatment principle (found in GATS Article II), such that WTO Members can engage in MRA activity on a selective basis and not extend recognition privileges to all other members immediately and unconditionally. One important obligation set forth in Article VII is found in paragraph 2, which requires a Member to afford adequate opportunity for (any) other interested WTO Members to negotiate accession to an existing MRA it has already concluded covering authorisation, licensing or certification of service suppliers, or to allow other WTO Members to negotiate similar MRAs with it. Such a form of open preferentialism sets Article VII apart from GATS Article V governing the establishment of preferential trade agreements and allowing Parties to them to withhold benefits from third countries.

GATS Article VII:4 sets out a number of procedural obligations requiring WTO Members to notify the Council for Trade in Services of existing recognition measures, of when they intend to initiate negotiations towards an MRA, or when they adopt new recognition measures or amend existing ones. These are important transparency obligations intended to afford broad access to all WTO Members interested in entering into such an MRA with a view towards multilateralising existing recognition arrangements to the greatest extent possible. Finally, Article VII:5 mandates WTO Members to work together towards the "establishment and adoption of international standards for the practice of relevant services trade and professions". To date, this has only been tackled at the WTO level in the area of accountancy services.⁹

The open nature of GATS Article VII has generated relatively little uptake among WTO Members who have preferred to conclude MRAs within the more fully hermetic confines of preferential trade agreements (such as ASEAN's AFAS) subject to the generally weaker disciplines of GATS Article V, thereby largely freeing them from the requirements set forth in Art. VII. In practice, most WTO Members that have entered into MRAs with preferential trade partners have notified such arrangements under GATS Art. V instead of GATS Art. VII. This has allowed them to avoid the requirement to first notify the MRA in question under GATS Art. VII and to subsequently afford other any interested WTO Member the chance to accede to such arrangements or negotiate similar MRAs with the Members in question.¹⁰

⁹ See http://www.wto.org/english/tratop_e/serv_e/accountancy_e/accountancy_e.htm (visited on 20 March 2014).

¹⁰ Some scholars have questioned the legality under WTO provisions of this approach. See in particular Mavroidis, P. C., & Marchetti, J. A. (2012). I now recognise you (and only you) as equal: an anatomy of (mutual) recognition agreements in the GATS. In I. Lianos, & O. Odudu, *Regulating Trade in Services in the EU and the WTO, Trust, Distrust and Economic Integration* (pp. 415-444). Cambridge University Press.

2.1.4. Multilateral Recognition Agreements and Preferential Trade Liberalisation

As noted above, a large number of MRAs have not been notified under GATS Art. VII but rather concluded under GATS Art. V on economic integration agreements. It is now commonplace that preferential trade agreements (PTAs) covering services feature substantive provisions embedding explicit MRA negotiating mandates across various professions.

PTAs take varying approaches to extending recognition to preferential trading partners. Some of the more ambitious arrangements, such as those between EU Member States or between Australia and New Zealand, contain legally enforceable obligations and provide for deep integration of each country's professional services and labour markets. Others contain little more than best endeavor clauses and an undertaking to conclude arrangements on a sectoral basis at an unspecified date in the future.¹¹

Much of the MRA-relevant treaty language found in PTAs tends to reiterate existing obligations of the contracting parties as WTO Members, such as the obligation not to accord recognition in a manner which would constitute a disguised restriction to trade. Also common are best-endeavour obligations aimed at getting the relevant professional associations and accreditation bodies in each contracting party to exchange information and cooperating with one another, since it is ultimately these bodies that will have to do the bulk of actual technical negotiations on what substantive criteria and procedural requirements will need to be met in order to grant recognition.

This is even truer in countries characterised by federal systems of governance, such as Canada or the United States, where the federal government negotiating trade treaties does not have competence over the regulation of professional services, hence needs to delegate such authority to provincial or state governments who in turn delegate it to professional licensing bodies.

Also common in many PTAs are guidelines or framework provisions that expound a certain number of basic principles that Parties to MRA negotiations should consider in the context of their recognition discussions. Such guidelines are meant to help licensing bodies in their MRA work and typically cover issues such as academic curriculum, training and experience requirements, licensing fees, continuing education requirements, language and other context-specific requirements, scope of practice limitations, bonding requirements for cross-border supply, temporary licensing regimes, ethics regimes, etc.

2.2. Negotiating a Mutual Recognition Agreement

Negotiating an MRA, regardless of the scope or the depth of the recognition envisaged, is always a time-consuming activity requiring a great deal of mutual information sharing, and probably months (or even years) of actual negotiations. For such negotiations to proceed, each party must have a domestic system in place for regulating the profession in question, which will normally be tasked with upholding quality standards, protecting consumers, and ensuring a sufficient number of licensed professionals are operating on the market at any given time (ensuring supply). Even where such domestic licensing systems are well established and operating at an advanced level, the job of actually comparing their compatibility, identifying possible lacunae and agreeing on ways

¹¹ See OECD. (2003). *Service Providers on the Move: Mutual Recognition Agreements*. Organization for Economic Cooperation and Development, Working Party of the Trade Committee. OECD.

to address such lacunae, is not likely to be a straightforward analytics exercise but will inevitably involve value judgments and subjective perceptions and evaluations of equivalency.

When governments try to establish frameworks and guidelines for the negotiation of MRAs, they can often do little more than encourage the professional associations within their territories to enter into such talks and (hopefully) conclude the desired MRAs in a reasonable period of time. Governments have little leverage to force professional associations to comply, except the threat of withdrawing the statutory powers delegated to such bodies. It is ultimately up to the professional associations and their members to decide just how enthusiastically they wish to embrace such talks, and this will depend, more than any other factor, on the offensive and defensive interests of their members.

In professions with a high degree of international mobility and the prospect of employment opportunities overseas, members of professional associations may be more pro-active in seeking to open up potential export markets for their services by concluding MRAs that give them access to those markets. In professions where local members already feel besieged by competition or are well aware of unfavourable prevailing price differentials between their services and those of foreign suppliers, there is likely to be little enthusiasm for negotiating and concluding an MRA that will only exacerbate an already difficult situation for them.

Nevertheless, professional associations clearly have a lot of discretion and leeway in negotiating such agreements, particularly in formulating how incentives are calibrated for foreign entrants. Some market segments or regions of the host country in question may be of little interest to foreign suppliers, such that fears over the competitive threat posed by new entry may often prove excessive. What's more, because entry of foreign skilled professionals is always contingent on parallel (negotiated) decisions to grant temporary access to foreign professionals under Mode 4 commitments, host countries have important means at their disposal to regulate the actual level of foreign entry.

It is important to recall the fact that MRAs are inherently reciprocal in character, hence ultimately aim to promote and facilitate the circularity of two-way movement among communities of professionals, thereby allowing repeat interaction, the building of trust among regulatory agencies, affording enhanced scope for collaborative business ventures among private representatives (including professional associations) and partnerships between those institutions of higher learning that are responsible for training providers of professional services.

The existence of genuine market access opportunities abroad (or the scope of heightened inflows of foreign direct investment consecutive to a trade agreement) will often play a key role in determining how openly and enthusiastically professional licensing bodies embrace the chance to negotiate mutual recognition arrangements to the benefit of their own members, while on the other hand opening up new market access opportunities on their members' domestic market to competition from foreign service suppliers. This requires both an understanding of the potential gains and possible losses (cost-benefits analysis), as well as the ability to formulate negotiating positions that will ultimately translate into compromises that do justice to such an analysis. However, care is needed to temper oft-expressed fears over the potentially dislocating character of liberalised trade in professional services, as foreign professional service firms often resort to partnerships with local firms or professionals in navigating what can be for many of them uncharted territory. MRAs may thus just as well heighten competition as they may offer useful scope for deeper forms of business collaboration between professionals from partner countries.

MRAs can also be harnessed by policymakers as a useful tool to overcome supply-side constraints in domestic services markets where there is a perceivable shortage of trained and qualified professionals, and can be used to inject much-needed competition and innovation where such

markets have otherwise become static or sluggish. MRAs can also be used as a public policy tool to address skills shortages that arise in the face of evolving demographic realities that are otherwise not being addressed by available domestic manpower, such as in the health care professions and the rapidly aging populations in more advanced industrial economies.

Because MRAs involve highly skilled activities, they can afford useful opportunities to each country's education authorities and to institutions of higher learning to collaborate in a range of higher education areas, from curriculum development to faculty and student exchanges as well as the establishment of joint degree programs and joint research endeavours. Such collaboration may also entice prominent foreign investors, who are often important conduits for foreign and local professional service supply, to invest in the creation of academic chairs in specific fields of professional practice (notably in engineering).

Summing up, MRAs can generate several benefits to signatories: (i) they can provide enhanced access to the markets for professional services of Parties to the MRA; (ii) provide a way for the importing country to make better use of imported skills and increase its comparative advantage in certain professional fields; (iii) allow the various regulatory bodies involved in granting rights to practice on a case-by-case basis to save time and resources by working together and engaging in a more effective division of labour; and (iv) enhance mutual learning and the transmission of regulatory experience, thus raising professional standards as well as the level of access to professional services among Parties. The process leading to an MRA such as the discussion and negotiations can constitute a stimulus for internal regulatory reform and the necessary adaptation of the professions to changing economic, educational, technological and social circumstances.

2.3. Mutual Recognition Models

There are four main models of mutual recognition of qualifications of professional services: first is the EU Model; second is NAFTA Model, third is the GATS Model and fourth is the Trans-Tasmanian Model.¹²



Figure 1: Models of MRAs

2.3.1. The EU Model

Under the EU model, the MRA normally provides a broad coverage through general recognition and the special recognition systems together with a strong enforcement system for non-compliance by the member states.

The main underlying principles governing the EU MRA is to further enhance the participation of the EU's citizens under the freedom of establishment and freedom to provide services. Freedom of establishment relates to Mode 3 whereas freedom to provide services relates to Mode 1 and Mode 4.

¹² Eva Hartmann, The role of qualifications in the global migration regime University of Lausanne GARNET Working Paper No: 39/08 April 2008.

Mutual recognition within the EU was first mentioned in the Treaty of Rome in relation to the professional services and the mutual recognition of diplomas in the common market. Article 3(c) of the Treaty of Rome states the need to “the abolition, as between Member States, of obstacles to freedom of movement for persons, services and capital” in order to assist in the creation of the Common Market.

The European Court of Justice (ECJ) applied the mutual recognition principles in the recognition of equivalence in goods such as through the case of *Cassis de Dijon* and others.¹³ The EU Model may be categorised as managed recognition, which is to ensure that “regulatory competition did not lead to consumer confusion and general downgrading of standards.”¹⁴ Managed mutual recognition in the EU does not require extensive prior harmonisation of qualifications across borders. Instead, MRA can involve variations in scope, automaticity and reversibility of access to compensate for existing differences in the ways in which professions are regulated.

The main EU legislation on mutual recognition of qualifications is the Qualifications Directive,¹⁵ which came in force in 2007. The Qualification Directive’s main aims are to encourage free movement of skilled labour around Europe; and to rationalise, simplify, and improve the rules for the recognition of professional qualifications.

The Qualifications Directive streamlined 15 legal instruments which had been in operation since 1970s and covers over 800 professions across Europe, whilst some professions such as the legal profession remain outside its scope. This means that an EU citizen with a professional qualification from one Member State should be able to move and practice in another Member State with relatively little friction.

The Qualifications Directive introduces two levels of recognition system: automatic recognition and general recognition system. The Qualifications Directive allows automatic recognition of qualifications for sectorial professions. One of the shortcomings of the EU system is that the regulators are, in general circumstances, unable to test language competence, request transcripts of training or test knowledge of applicants trained within the EU or EEA, who meet EU requirements for direct entry to the register and check any professional experience since they originally qualified, regardless of how long ago they qualified.

At the same time, the EU recognises that there is still lack of awareness of enterprises and national authorities on the existence of the mutual recognition principle.¹⁶ The EU also recognises that there is a lack of dialogues between competent authorities in different member states. The mutual recognition system is also costing the EU and the competent authorities in certain areas such as information gathering costs, compliance costs and conformity assessment costs. It is also found that in the mutual recognition sometime the costs of gaining access to the market of another Member State are nearly twice as high as for big companies as a share of total turnover.¹⁷

¹³ Case C-120/78, see also *German Beer Standards*, Case 178/84 (1988) 1 CMLR 780.

¹⁴ Kalypso Nicolaidis and Susanne Schmidt, Mutual Recognition ‘on trial’: the long road to services liberalisation,’ *Journal of European Public Policy* 14:5 August 2007: 717-734.

¹⁵ The Directive 2005/36/EC on recognition of professional qualifications was adopted on 7 September 2005, consolidating 15 Directives, 12 Main (Sectorial) Directives and three General System Directives into a single text.

¹⁶ European Commission, Executive Summary of Impact Assessment, Accompanying document to the Proposal for a Directive of the European Parliament and The Council of Ministers, 3052/95/EC, {COM(2007) 36 final.

¹⁷ European Commission, Executive Summary of Impact Assessment, Accompanying document to the Proposal for a Directive of the European Parliament and The Council of Ministers, 3052/95/EC, {COM(2007) 36 final.

2.3.2. NAFTA Model

Under the NAFTA Model, which is implemented in NAFTA countries and countries having PTAs with NAFTA countries, recognition is not included in the main agreement or framework but delegated to the various organisations or professional bodies.

NAFTA provides for the free movement of professional and business persons under Mode 4. Under Chapter 16 of NAFTA, four categories of business persons and professional service providers, such as accountants, architect with credentials, land surveyors and engineers that meet the minimum standard set by NAFTA Countries can enter each member country temporarily to conduct business. The nationals of each country are required to comply with the applicable licensing or certification requirement regarding professions of the host country.

Under NAFTA, professionals are exempt from the job validation process normally imposed on those seeking work. The professional must be a recognised professional, must meet the educational requirements of the occupation, have a pre-arranged employment or contractual agreement with an entity located in the host country; and meet the host country's requirements for temporary entry.

2.3.3. GATS Model

Under the GATS Model the recognition mechanism is delegated to the relevant professional bodies and the countries to adopt. As discussed above, GATS addresses MRA in Article VII, which provides for the right to recognise the education or experience obtained, requirements met, or licences or certifications granted in WTO members. Recognition can be accorded autonomously or can be based upon an agreement or arrangements between members.

Under Article VII.3 of GATS, a Member State must not accord recognition in a manner which constitutes a means of discrimination between the parties of such an agreement when applying its standards or criteria for the authorisation, licensing or certification of service suppliers, or a disguised restriction on trade in services. This means that a Member State will have to apply the same standards to professional service providers from all Member States.

In the event that a Member State enters into an MRA with another Member State, the Member States must afford adequate opportunity for other interested Member States to accede to the MRA or to negotiate comparable ones. Where Member States accord recognition autonomously, they are requested to afford adequate opportunity for any other Member States to demonstrate that education, experience, licences, or certifications obtained or requirements met in that other Member's territory should be recognised.

Article VI.6 requires Member States to provide adequate procedures to verify the competence of professionals of other Member State where they have undertaken specific commitments regarding professional services. Article VI.3 requires WTO members to ensure that competent authorities consider the application of a foreign service-provider seeking authorisation within a reasonable time. At the request of the applicant, the competent authorities shall provide information on the status of the application without undue delay. In addition, WTO Member States are required to make remedy available against the decision of their competent authorities.

2.3.4. Trans-Tasmanian Mutual Recognition Agreement

The Trans-Tasmanian Mutual Recognition Agreement or TTMRA was signed between Australia and New Zealand in 1992 and came into effect in 1997. TTMRA requires professionals to pass an 'equivalence test', without the need to spell out common standards and requirements for training.¹⁸

TTMRA contains provisions enabling registration authorities to impose conditions on registration to achieve equivalence between occupations. The relevant registration authority determines what conditions should be imposed based on its assessment of whether the activities authorised to be carried out under registration in the respective jurisdictions are substantially the same. These conditions may comprise the limiting of activities authorised by registration subject to the completion of further relevant training.

TTMRA covers, among others, all registrable occupations, except medicine, which is subject to a different type of arrangement. TTMRA provides that a person registered to practice an occupation in Australia is entitled to practice an equivalent occupation in New Zealand, and vice versa, without the need for further testing or examination but subject to the need to notify the local registration authority.

Under the Australian Mutual Recognition Act, registration is defined as "... *the licensing, approval, admission, certification (including by way of practising certificates), or any other form of authorisation, of a person required by or under legislation for carrying on an occupation.*"¹⁹

To apply for registration under TTMRA, individuals must forward written details of their registration in their home jurisdiction to the registration board in the second jurisdiction and sign a consent form enabling the registration board to undertake reasonable investigations relating to their application. The notice must be accompanied by a person's registration papers or include a copy and a statement certifying that the papers are authentic. The statements and other information contained in the notice must also be verified by statutory declaration.

Registration authorities have one month from the date of lodgement of the notice to formally grant, postpone or refuse registration, failing which the person is entitled to immediate registration. When granted, registration takes effect from the date of lodgement of the notice.

A registration authority may impose similar conditions on registration to any that already apply to a person's original registration or which are necessary to achieve equivalence between occupations. Individuals should be advised in writing if conditions on registration are to be imposed. The registration authority is required to advise the person of his or her right to appeal to the relevant Tribunal against the decision. The person may also seek a statement setting out the registration authority's reasons in full.

If a person's initial registration is cancelled, suspended or subject to a condition on disciplinary grounds, or as a result of or in anticipation of criminal, civil or disciplinary proceedings, then

¹⁸ Kalypso Nicolaidis and Susanne Schmidt, 'Mutual Recognition 'on trial': the long road to services liberalisation,' *Journal of European Public Policy* 14:5 August 2007: 717-734.

¹⁹ Mutual Recognition Act 1992, s. 4.1.

the person's registration under TTMRA is affected in the same way. However, a registration body may reinstate any cancelled or suspended registration or waive any conditions if it thinks it appropriate in the circumstances.

2.4. International Mutual Recognition Agreements for Engineering

A number of mutual recognition agreements have been established between professional or industry associations in engineering services. The arrangements often entails international standards, which are non-binding and considered "good practice" for education and professional skills, guidelines for assessing professional capabilities and competence guidelines for members. These include the Washington Accord and the Sydney Accord.

The Washington Accord was signed in 1989 between relevant organisations responsible for accrediting professional engineering degrees in each of the signatory countries. Under the Washington Accord, institutions which are full members agree to recognise the substantial equivalence or comparability of accreditation processes used by other institutions in relation to engineering qualifications at the first professional degree or basic engineering education only. The Washington Accord does not address mutual recognition of professional credentials such as the Professional Engineer (PE) or Chartered Engineer (CE).

Among the AMS, only Malaysia and Singapore are signatories to the Washington Accord. Malaysia, represented by the Board of Engineers Malaysia (BEM), became a signatory in 2009 and Singapore, represented by the Institutions of Engineers Singapore (IES), became a signatory in 2006. In addition, the Philippines represented by the Philippines Technology Council holds a provisional status.

The Sydney Accord, which was signed in June 2001, recognises the substantial equivalence of the accreditation decision of the signatories at the level of 'Engineering Technologist' in the same signatory countries of the Washington Accord, apart from the United States. However, the term 'Engineering Technologist' is difficult to define and the type of degrees have not been sufficiently developed and/or accreditation systems are not in place.

In May 2002 the national engineering organisations of the UK, Ireland, South Africa, and Canada signed the Dublin Accord, an agreement mutually recognising the qualifications which underpin the granting of Engineering Technician titles in the four countries. The operation of the Dublin Accord is similar to that of the Washington and Sydney accords.

In addition, APEC economies agreed upon the formation of the APEC Engineer Framework. The APEC Engineer Framework is an agreement in place between APEC countries for the purpose of recognising "substantial equivalence" of professional competence in engineering. APEC economies can apply to become members of the framework by demonstrating that they have in place systems which allow the competence of engineers to be assessed to the agreed international standard set by the APEC Engineer Framework.

Once they become members, economies are then authorised to operate an APEC Engineer Register, under which practicing engineers within the economy can be listed if they meet the agreed standards.

Applications for authorisation to operate an APEC Engineer Register within an APEC economy must conform to the principles set out in the APEC Engineer Manual and to such guidelines as may be approved from time to time by the APEC Engineer Coordinating Committee.

Qualified engineers of an APEC economy may apply to be listed on their economy's register provided they meet agreed standards, namely that they have:

- Completed an accredited or recognised engineering program, or assessed recognised equivalent; and
- Been assessed within their own economy as eligible for independent practice; and
- Gained a minimum of seven years practical experience since graduation; and
- Spent at least two years in charge of significant engineering work; and
- Maintained their continuing professional development at a satisfactory level.

This approach ensures a substantially equivalent level of professional competency across APEC Engineers, despite differences in national licensing regimes across APEC economies. Current members of the APEC Engineers framework include Australia, Canada, Chinese Taipei, Hong Kong China, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, Thailand and the United States.

While the APEC Engineer Framework is itself not an MRA, it provides the basis for agreeing bilateral MRAs between the relevant bodies of the APEC economies that maintain APEC Engineer Registers. Such MRAs would result in engineers on one Party's register being recognised as licensed engineers by the other Party and vice-versa without any further technical assessment (but possibly subject to some additional limited requirements).

One example is the MRA between Engineers Australia, the National Engineering Registration Board (Australia), the Institution of Professional Engineers Japan, and Japan's Ministry of Education, Culture, Sports, Science and Technology.

2.5. Mutual Recognition of Engineers in ASEAN

2.5.1. AFAS Provisions

Liberalisation and mutual recognition of professional services, including the engineering profession, in ASEAN is governed and facilitated by AFAS. Article V.1 of AFAS acknowledges the rights of the AMS to recognise the education or experience obtained, requirements met, or licences or certifications granted in an AMS without obliging it to extend the recognition to other AMS. AFAS also provides a framework for the AMS to negotiate MRAs.

ASEAN Heads of Governments agreed, at the 11th ASEAN Summit, with the decision in the 37th Meeting of ASEAN Economic Ministers ("AEM") to accelerate the liberalisation of ASEAN trade in services, by bringing forward its implementation from 2020 to 2015. The liberalisation is intended to improve the efficiency and competitiveness, diversity, production capacity, and supply and distribution of services of ASEAN services suppliers within and outside ASEAN, beyond those undertaken by AMS under the GATS with the aim to realising a free trade area in services.

The decision of the Declaration of ASEAN Concord II (Bali Concord II) adopted at the Ninth ASEAN Summit on 7th October 2003 in Bali, Indonesia, called for the completion of MRAs for qualifications in major professional services by 2008 to facilitate free movement of professionals, skilled labour and talents in ASEAN.

The Bali Concord II provides for the AEC as the realisation of the end-goal of economic integration as outlined in the ASEAN Vision 2020. To achieve the AEC, the Summit adopted the Recommendations of the High Level Task Force on ASEAN Economic Integration

(“HLTF”) which outlined a number of measures for trade in services, including:

- a. Set clear targets and schedules of liberalisation towards achieving free flow of trade in services earlier than 2020, with accelerated liberalisation of priority sectors by 2010.
- b. Accelerate liberalisation in specific sectors earlier than end-date through the application of ASEAN-X formula.
- c. Complete MRA for major professional services by 2008.

The existence and implementation of the MRAs would enable professional service providers who are registered or certified in signatory AMS to be equally recognised in other signatory AMS, hence facilitating the flow of professional services providers within ASEAN.

The ASEAN Coordinating Committee on Services (CCS) has established an Ad-Hoc Expert Group on Mutual Recognition Arrangements with the objective of realising framework agreements on mutual recognition for identified priority professional services. CCS decided to adopt the sectorial approach in developing mutual recognition arrangements for the identified professional services in ASEAN.

2.5.2. Mutual Recognition Agreement for Engineering

The ASEAN Mutual Recognition Agreement on Engineering Services 2005 is one of the initiatives stemming from the establishment of the AEC. The MRA on Engineering Services was negotiated and drafted by an expert group comprising Government officials and representatives from the engineering bodies from of all AMS.

The MRA for engineering defines Professional Engineer (PE), Registered Foreign Professional Engineer (RFPE), and Professional Regulatory Authority (PRA). A PE refers to an individual citizen of AMS by which the PRA has declared as technically feasible, moral, and legal profession for practising engineers. A PE has to receive permission and licence to practice from the PRA of country of origin.

The PRA in each AMS has the following tasks:

- a. To accept applications from the ASEAN Chartered Professional Engineer (ACPE) and allow the ACPE to work in the host country as a RFPE;
- b. To supervise the practice of RFPE and ensure their compliance with regulations;
- c. To ensure high standards of practice in the application of the engineers; and
- d. To exchange information on legislation, application procedures, and applicable standards in the field service engineer among PRA of AMS.

The administration of the ACPE is being coordinated by the ASEAN Professional Engineer Coordinating Committee (ACPECC), which acts as an oversight body at the regional level and consists of one representative from the Monitoring Committee of each of the AMS. ACPECC have the authority to confer and withdraw the title of ACPE.

Article 3 of the MRA details the qualifications required by an engineer to be recognised as a PE and thereafter be eligible to apply to the ACPECC to be registered as a PE with the ACPE. Appendix II provides for the Guidelines on the criteria to be followed by professional engineers for the purpose of submitting application to the ACPECC.

Once a professional engineer is registered with the ACPE, the ACPE would submit an application to any of the professional bodies in any of the AMS for the purpose of registering the professional engineer. The engineer may practise in any of the AMS he or she is registered in, subject to the domestic laws and regulations of the host AMS.

Article 5 provides for the exemption granted to professional engineers from further assessment by the PRA each AMS. Engineers may be assessed on their understanding of the general principles behind applicable codes of practice and laws, their capacity of applying such principles safely and efficiently and that they are familiar with other special requirements existing in the Host Country.

03.

**QUALIFYING AND
PRACTICING AS AN
ENGINEER IN ASEAN
MEMBER STATES**

3.1. Introduction

Chapter 2 discusses the definition, concept and design of mutual recognition in engineering services in ASEAN and other parts of the world. Mutual recognition, as explained, is an approach where one country recognises the qualifications and experiences required in another country as equivalent to those imposed in the former.

The Chapter discusses the qualifications and experience required in all AMS for engineering professionals. In addition, the Chapter also provides an overview of the requirements to set-up engineering practice in AMS, and the requirements for foreign engineering professionals to practice in the relevant AMS.

3.2. Brunei Darussalam

3.2.1. Laws and Regulations

The main domestic legislation governing engineering profession in Brunei Darussalam (Brunei) is the Architects, Professional Engineers and Quantity Surveyors Order 2011, which at the time of writing is in the process of being brought into force. The main regulator for the profession is the Board of Architects, Professional Engineers and Quantity Surveyors under the Ministry of Development.

Under the Order, “professional engineering services” means *“consultancy or advisory services that require a person to engage in professional engineering work; whereas “professional engineering work” includes:*

any service, consultation, investigation, evaluation, planning, design, or responsible supervision of construction or operation in connection with any public or privately owned public utilities, buildings, machines, equipment, processes, works or projects wherein the public interest and welfare, or the safeguarding of life, public health or property is concerned or involved, and that requires the application of professional engineering principles and data.

The Order will be enforced once relevant regulations are approved by the relevant authority. Pending the enforcement of the Order registration of engineers is conducted administratively by Board of Architect, Professional Engineers and Quantity Surveyor.

Among the functions of the Board are to keep and maintain a register of architects, professional engineers and quantity surveyors; to hold or arrange for the holding of such examinations as the Board considers necessary for the purpose of enabling persons to qualify for registration under this Order; to approve or reject applications for registration under this Order or to approve any such application subject to such restrictions as the Board may consider fit to impose; and to cancel, remove or reinstate any registration.

The Board is also responsible to make recommendations, with the approval of the Minister, the scale of fees to be charged by professional engineers for professional engineering services rendered. The Board is also mandated to establish, maintain and develop standards of professional conduct and ethics of the professional engineering professions. In discharging the function, the Board may hear and determine disputes relating to professional conduct or ethics of registered professional engineers or to appoint a committee or arbitrator to hear and determine those disputes.

The Board is also responsible to license corporations or multi-discipline partnerships which intend to supply architectural, professional engineering or quantity surveying services in Brunei Darussalam; and to promote learning and education in connection with professional engineering.

3.2.2. Professional Association

The main professional association for professional engineers in Brunei is the Pertubuhan Ukur, Jurutera dan Arkitek Brunei (PUJA).

Persons of not less than eighteen (18) years of age, and who satisfy the particular qualifications are eligible for membership. There are three types of membership: Corporate members; Associate Members and Student Members.

Corporate members are persons who have recognised academic qualifications in surveying, engineering, and architecture acceptable to the Council. Associate members are persons who have at least three years' experience in the said professions and have qualifications which are acceptable to the Council. Student Members are persons who enrolled and undergoing relevant courses, acceptable to the Council, at places of learning.

3.2.3. Qualifying as a Professional Engineer

Under the Order, the following persons are entitled to apply for registration as professional engineers:

- a. A corporate member of an institution recognised by the Board;
- b. A person who holds any degree, diploma or any other qualification which the Board may approve for the purpose of entitling him to be a registered professional engineer; or
- c. Any person who satisfies the Board who has academic qualifications in professional engineering and who passes such examinations as may be required by the Board.

Under the administrative process, an applicant has to submit a form for registration, enclosing supporting documents including registration fees; certified true copies of academic certificates; certified true copies of the Company and Business Names Registration; Employer's credential letter; professional indemnity insurance; Current "Chartered Member" of a professional institution accepted and recognised by the Government of Brunei Darussalam; and Current Corporate Member of the recognised institution such as the *Persatuan Ukur, Jurutera, Arkitek* (PUJA) Brunei Darussalam.

The Board also allows registration of specialist professional engineers. A specialist professional engineer is a registered professional engineer who:

- a. Has sat and passed such examination as may be prescribed by the Board, or holds such postgraduate degrees or qualifications or has gained such special knowledge in a specialised branch of engineering as may be approved by the Board;
- b. Has such experience in that specialised branch of architecture, engineering or quantity surveying as may be required by the Board; and
- c. Has fulfilled such further conditions as may be specified by the Board.

Foreign applicants must also enclose valid employment pass or work permit, proof of continuous residency in Brunei working in the engineering sector for a minimum of 1 year (new applicant) or proof of residency of at least 90 days in a calendar year and a brief schedule of overseas trips and days residing in Brunei Darussalam (for renewal applicants).

3.2.4. Setting-up an Engineering Practice

Professional engineers may conduct engineering practice in Brunei through one of the following modes of business: sole proprietorship, partnership, limited liability partnership (LLP) or body corporate. For integrated engineering services, foreign equity participation is opened up to a maximum of 55% of the total equity.

The Board may grant a licence to any LLP to supply professional engineering services in Brunei Darussalam if -

- a. the statement lodged by the partners of the LLP with the Registrar of Limited Liability Partnerships under section 16(1) of the Limited Liability Partnerships Order, 2010 (S 117110) provides that a primary nature of the business of the limited liability partnership is to supply professional engineering services;
- b. the partners in the LLP consist only of persons who satisfy such requirements as the Board may determine;
- c. at least one of the partners of the LLP is a registered professional engineer who has a valid practising certificate;
- d. the business of the LLP so far as it relates to professional engineering services in Brunei Darussalam, will be under the control and management of a partner who is a registered professional engineer who has a valid practising certificate; is authorised under a resolution of the partners of the LLP to make all final professional engineering decisions on behalf of the LLP with respect to the requirements of this Order, the rules or any other law relating to the supply of professional engineering services by the LLP; and
- e. the LLP is insured against professional liability in accordance with section 30 and the rules.

The Board may also issue licence for multi-discipline and corporate practice provided that the applicant is a body corporate supplying architectural, professional engineering or quantity surveying services in Brunei Darussalam. To qualify for the multi-discipline practice, the body corporate must meet the following requirement:

- a. the memorandum of association stating the primary object of the body corporate is to supply architectural, professional engineering or quantity surveying services;
- b. to have a paid-up capital not less than the amount prescribed by the Minister by notification in the Gazette;
- c. the Articles of Association which provides that at least a prescribed number or proportion of its directors shall be registered architects, registered professional engineers or registered quantity surveyors each of whom have a valid practising certificate;
- d. so far as it relates to the supply of architectural, professional engineering or quantity surveying services, be under the control and management of a director of the body corporate who is a registered architect, a registered professional engineer or a registered quantity surveyor who has in force a practicing certificate; and is authorised under a resolution of the board of directors of that body corporate to make all final architectural, professional engineering or quantity surveying decisions on its behalf with respect to the requirements of this Order, the rules or any other law relating to the supply of architectural, professional engineering or quantity surveying services by it; and
- e. be insured against professional liability.

At the same time, the Board may also grant to a partnership not consisting wholly of registered professional engineers a licence to supply professional engineering services in Brunei Darussalam if -

- a. the partnership is one in which only registered professional engineers and allied professionals, who each has a valid practising certificate, have a beneficial interest in the capital assets and profits of the partnership; and

- b. the business of the partnership, so far as it relates to the supply of professional engineering services in Brunei Darussalam, will be under the control and management of a partner who is a registered professional engineer and has a valid practicing certificate.

It is a requirement that Engineering drawings and plans should be submitted by licensed practicing engineers and registered company or partnership in Brunei Darussalam.

Foreign nationals are required to obtain an Employment Visa issued by the Department of Immigration and National Registration, Brunei Darussalam to take up employment in Brunei Darussalam. The application for an Employment Visa may be lodged either by the sponsor or employer.

3.3. Cambodia

3.3.1. Laws and Regulations

The main law governing the engineering profession in Cambodia is the Royal Decree 0409/413 dated 7 April 2009 which establishes the Board of Engineers of Cambodia (BEC). Other important domestic regulations are the Decision on the Registration Requirements and Determination of Fees of the Board of Engineers Cambodia No. 44/09 dated 25 September 2009; and the Decision on the Registration Procedure of the Board of Engineers Cambodia, No. 56/09 dated 6th November 2009.

BEC's functions include the registration of engineers and the upgrading of professional qualifications of engineers in Cambodia. Under the Royal Decree, the term "engineer" refers to *"Cambodian or foreign individual who has successfully graduated in engineering from recognized Cambodian tertiary institutions or abroad in accordance with the laws and regulations of the Kingdom of Cambodia."* In addition, the term "professional engineer" refers to *"Cambodian or foreign engineer who is registered in the Register of Professional Engineers by the BEC and has been eligible in accordance with the law and regulations of the Kingdom of Cambodia."*

The Royal Decree applies to both Cambodian and foreign registered engineers. Engineers practicing in Cambodia are required to comply with the Code of Professional Engineers issued and approved by the BEC. The Royal Decree is not applicable to engineers practising in the public sectors such as ministries and public institutions.

3.3.2. Qualifying as a Professional Engineer

There are two levels of engineers, graduate engineers and professional engineers. A graduate engineer shall only practice the engineering profession under the supervision and responsibility of a professional engineer.

As such there are two levels of registration, namely the preliminary registration for graduate engineers and the professional registration for professional engineers. For preliminary registration, the applicant must meet the following requirement:

- a. A permanent resident of Cambodia;
- b. Having an engineering degree, either at the doctorate, masters or bachelor level issued by an institute of higher education either in Cambodia or abroad, and must have been accredited in accordance with the laws and regulations of the Kingdom of Cambodia.

- c. Have passed the examination set by the BEC, in the following subjects:
 - i. Fundamental theory of the requested specialisation;
 - ii. Code of Ethics of Engineers; and
 - iii. Laws, regulations and decisions of the BEC.

Successful applicants will be registered in the list of the BEC whereas the unsuccessful ones will be required to participate in the training course determined by the BEC before re-applying.

A candidates seeking to be licensed as a Professional Engineer shall meet the following criteria:

- a. A registered engineer with the BEC;
- b. A minimum of 2 years of professional experience for those with a graduate degree; 3 years of professional experience for those with a master degree; and 5 years of professional experience for those with a bachelor in engineering;
- c. Successfully passed the training course organised by the BEC;
- d. A permanent resident of Cambodia;
- e. Having obtained Security Clearance; and
- f. Successfully passed the Professional Engineering examination. The examinations consist of oral examination and written examination, in the field of:
 - i. Planning;
 - ii. Techniques;
 - iii. Economics;
 - iv. Architecture;
 - v. Management; and
 - vi. Research in accordance with the requested field.

Unsuccessful candidates will be asked to attend a supplementary course in order to retake the examinations after 6 months from the first sitting.

A foreign engineer intending to practice in Cambodia is required to be registered with the BEC. The foreign engineer must be a registered professional engineer in the home country, has been in Cambodia for a minimum of 3 months; employed in a specific project and certified by the organisation running the project.

The application for registration as a foreign engineer must be accompanied by a certified true copy of the engineering degree and Professional Engineer Certificate duly certified by the Consulate of the engineer's home country; job certificate issued by the current professional institution in Cambodia, certified true copy of passport and visa, security clearance from the home country; curriculum vitae; and registration and annual fee.

3.3.3. Setting-up an Engineering Practice

Firms supplying professional engineering services are required to apply for an approval from the Ministry of Land Management, Urban Planning and Construction and the Ministry of Public Works and Transport.

These firms can be established either as a private corporation, limited corporation or partnership. Firms with 100% foreign owned capital or foreign joint-venture firms can only be established in form of a limited corporation. The leader or executive manager of the firm is required to have professional practicing certificate recognised by BEC. There is

no requirement for minimum capital. Foreigners wishing to set up practice in professional engineering must first register with the BEC, must have at least 7 years' experience and pass BEC professional examination.

3.4. Indonesia

3.4.1. Laws and Regulations

Relevant laws, regulations and licensing bodies for the engineering profession in Indonesia depend on whether the engineering professions are related to construction services.

- **Construction Related**

Engineering works are considered related to construction services if they consist of civil, mechanical, electrical and environmental engineering. These sectors are regulated by the Construction Services Act No. 18/1999.

The implementation of the engineering sectors is further regulated by the Government Regulations No. 28/2000 on Business and Society on Construction Service Role (revised by No. 4/2010 & No. 92/2010), No.29/2000 (revised by No. 59/2010), and No. 30/2000.

The provisions of the practice of the engineering sectors are also regulated in the Presidential Regulations, Ministerial Regulations and Construction Services Development Board (*Lembaga Pengembangan Jasa Konstruksi*) (LPJK) rules and regulations, which is the main registration body for the construction related engineering.

To be registered by LPJK an engineer shall obtain a recommendation or competence certificate from any Professional Certification Unit (*Unit Sertifikasi Tenaga Kerja - USTK*) licensed by the LPJK. The process of certification can either be centralised or decentralised according to the internal regulation of the LPJK.

To practice engineering services in the Province of Jakarta, an engineer shall further obtain professional licence (*Ijin Pelaku Teknis Bangunan – IPTB*) from the respective local government office. The other provinces in Indonesia have not regulated this practice yet.

- **Non-construction Related**

Engineering services other than those specified in the Construction Services Act No. 18/1999 are regulated under Manpower Act No. 13/2003 and the Government Regulation No. 23/2004. The non-construction related engineering professionals are governed by *Badan Nasional Sertifikasi Profesi* (BNSP) or the Indonesian Professional Certification Authority (IPCA).

- **New Act on Engineering Profession**

Indonesia has enacted the Act on Engineering, Act No. 11/2014, which governs the practice of engineering by engineers, including the registration and certification of engineers. To be effective, the Act will need the enactment of implementing regulations which will be put in place within two years of the enactment of the Act. The new Act will change how engineers are registered and certified in the near future, but until the implementing regulations are in place, the current acts and regulations such as the Construction Services Act will remain valid.

- **Regulations for Foreign Professionals**

Foreign engineering professionals seeking to work in Indonesia will also need to comply with certain other laws such as the Act No. 13 Year 2003 on Employment; the Presidential Regulation No.72 Year 2014 on Employment of Foreign Workers and Implementation of Education and Training of Co-workers; and the Minister of Work and Transmigration Regulation No.12 Year 2013 on Procedure for Employing Foreign Workers.

3.4.2. Professional Associations

There are many professional associations for the engineering profession in Indonesia. They include:

1. *Ikatan Arsitek Indonesia* (IAI) or Indonesian Institute of Architects;
2. *Himpunan Pengembangan Jalan Indonesia* (HPJI) or Indonesian Road Development Association;
3. *Persatuan Insinyur Indonesia* (PII) or The Institution of Engineers Indonesia;
4. *Himpunan Ahli Teknik Hidraulik Indonesia* (HATHI) or Indonesian Association of Hydraulic Engineers;
5. *Asosiasi Tenaga Teknik Indonesia* (ASTTI) or Indonesian Institute of Construction Engineers;
6. *Asosiasi Tenaga Ahli Konstruksi Indonesia* (ATAKI) or Indonesian Society of Construction Experts;
7. *Ikatan Nasional Tenaga Ahli Konsultan Indonesia* (INTAKINDO) or National Association of Consulting Professionals Indonesia;
8. *Asosiasi Tenaga Teknik Ahli dan Terampil Indonesia* (ASTTATINDO) or The Indonesian Association of Engineering Skilled and Expert;
9. *Himpunan Ahli Konstruksi Indonesia* (HAKI) or Indonesian Society of Civil and Structural Engineers;
10. *Asosiasi Profesionalis Elektrikal-Mekanikal Indonesia* (APEI) or Association of Indonesia Electrical and Mechanical Professionals;
11. *Himpunan Ahli Teknik Iluminasi Indonesia* (HTII) or Illuminating Engineers Association of Indonesia;
12. *Himpunan Ahli Teknik Tanah Indonesia* (HATTI) or Indonesian Society for Geotechnical Engineering;
13. *Ikatan Ahli Perencanaan Indonesia* (IAP) or Indonesian Association of Planners;
14. *Komite Nasional Indonesia untuk Bendungan Besar* (KNI-BB) or Indonesian National Committee on Large Dams;
15. *Himpunan Ahli Elektro Indonesia* (HAEI) or Association of Indonesian Electrical Experts;
16. *Perhimpunan Ahli Teknik Indonesia* (PATI) or Indonesian Society of Engineers and Technicians;
17. *Persatuan Insinyur Profesional Indonesia* (PIPI) or Indonesia Professional Engineer Association;
18. *Ikatan Ahli Teknik Penyehatan Indonesia* (IATPI) or Indonesian Society of Sanitary and Environmental Engineers;
19. *Ikatan Surveyor Indonesia* (ISI) or Indonesian Surveyors Association;
20. *Himpunan Ahli Perawatan Bangunan* (HAPBI) or Association of Building Maintenance Experts;
21. *Ikatan Ahli Konstruksi Indonesia* (IAKI) or Construction Expert Association of Indonesia;
22. *Asosiasi Profesi Mekanikal Elektrikal Indonesia* (APMELINDO) or Association Professional Mechanical Electrical of Indonesia;
23. *Asosiasi Tenaga Teknik Konstruksi Indonesia* (ASTEKINDO) or Indonesian Construction Engineer Association;
24. *Perhimpunan Tenaga Ahli dan Terampil Indonesia* (PERTATI) or Association Expert and Skill of Indonesia;

25. *Asosiasi Sumber Daya Manusia Konstruksi Indonesia* (ASDAMKINDO) or Association of Indonesia Human Resource Construction;
26. *Ikatan Ahli Pracetak dan Prategang Indonesia* (IAPPI) or Indonesian Association of Precast and Prestressed Engineers;
27. *Ikatan Ahli Manajemen Proyek Indonesia* (IAMPI) or Indonesia Society of Project Management Professionals;
28. *Himpunan Ahli Manajemen Konstruksi Indonesia* (HAMKI) or Indonesian Society of Construction Management Professionals;
29. *Asosiasi Ahli Keselamatan dan Kesehatan Kerja Konstruksi Indonesia* (A2K-4) or Association of Occupational Health and Safety Construction Indonesia;
30. *Asosiasi Profesi Tenaga Ahli Konstruksi Indonesia* (APTAKINDO) or The Indonesian Profession Skill for Construction Association; and
31. *Asosiasi Tenaga Ahli Pemborong Indonesia* (ATAPI) or Indonesian Constructor Association Expert.

3.4.3. Qualifying as a Professional Engineer

As discussed above, for the construction services related engineers, certification of engineers is conducted by LPJK, while for non-construction services related engineers, certification is conducted by BNSP.

In carrying out the duties as a certification body, LPJK and BNSP may delegate the authority to the Professional Certification Units licensed or accredited by the national LPJK or BNSP. The Professional Certification Units accredited by LPJK is called the *Unit Sertifikasi Tenaga Kerja* (USTK) while the one accredited by BNSP is called the *Lembaga Sertifikasi Profesi* (LSP). The process of accreditation of certification bodies mentioned above refers to the provisions of ISO 17011.

Professional associations, industry associations and parties associated with the profession may form Professional Certification Units who subsequently request accreditation / license as mentioned above. In implementing the system of professional competency certification, the professional certification units refer to the provisions of ISO 17024 for personnel certification.

For an applicant to obtain an engineer competency certificate, the person must be a holder of an engineering degree from an accredited university/college; must have at least 3 years work experience in the engineering field; registered as a member of a professional association; and has passed the competence assessment and declared competent by the USTK.

In conducting the competency assessment, the USTK implements the national competency standards (*Standar Kompetensi Kerja Nasional Indonesia* - SKKNI), specific standards or international standards that have been registered at the Indonesian Ministry of Manpower.

Based on the recommendation of the competency from a USTK, LPJK or BNSP produces a certificate of competency, register the certificate and to issue a license in accordance with the terms of employment of each sector. For construction related services, the certificate is called *Sertifikat Kompetensi Ahli* - SKA, published by LPJK.

Competency certificate holders are also required to have and fill engineer's Continuing Professional Development (CPD) document, issued by the relevant professional associations where the engineer is registered. CPD document is used as a requirement for the renewal of competency certificates. A certificate of competency for engineers is valid for 3 years which may be extended in accordance with the provisions required by their respective professional associations.

3.4.4. Setting-up Engineering Practice

Professional Consulting firms in the field of construction services are regulated by:

1. Indonesia Horizontal and Specific Commitments for AFAS;
2. Act No. 18 Year 1999 on Construction Services;
3. Act No. 40 Year 2007 on Limited Liability Company;
4. Act No. 28 Year 2007 on 3rd revision of Act no. 6 Year 1983 on Tax Provisions & Procedures;
5. Government Regulation No. 28 Year 2000; Government Regulation No. 4 Year 2010; Government Regulation No. 92 Year 2010 on Society Efforts & Roles in Construction Services, No. 29 Year 2000; Government Regulation No. 59 Year 2010 on Construction Services Practices and No. 30 Year 2000 on Construction Services Development;
6. Ministry of Public Works Regulations No. 28 Year 2006 on Permit for Representative of Foreign Construction Business Entity;
7. Ministry of Public Works Regulations No. 04/PRT/M/2011 on Guidelines on Requirements for Granting Permit for National Construction Services;
8. Ministry of Public Works Regulations No. 05/PRT/M/2011 on Guidelines on Requirements for Granting Permit for Representative of Foreign Entity in Construction Services;
9. Ministry of Public Works Regulations No. 08/PRT/M/2011 on The Division of Sub-classification and Sub-qualification of Construction Services;
10. LPJK Regulation No. 7 Year 2012 on Licencing Committee and Licencing Procedure;
11. LPJK Regulation No. 9 Year 2012 on Establishment of Certification Unit for Manpower;
12. LPJK Regulation No. 4 Year 2011 on Procedure for Re-registration , Validity Extension and New Application of Construction Professional Certificate;
13. LPJK Regulation No. 4 Year 2013 on First Amendment of LPJK Regulation No. 4 Year 2011 on Procedure for Re-registration, Validity Extension and New Application of Construction Professional Certificate;
14. LPJK Regulation No. 6 Year 2013 on Second Amendment of LPJK Regulation No. 4/ 2011 on Procedure for Re-registration, Validity Extension and New Application of Construction Professional Certificate;
15. LPJK Regulation No. 1 Year 2014 on Third Amendment of LPJK Regulation No. 4/ 2011 on Procedure for Re-registration, Validity Extension and New Application of Construction Professional Certificate;
16. LPJK Regulation No. 8 Year 2014 on Fourth Amendment of LPJK Regulation No. 4/ 2011 on Procedure for Re-registration, Validity Extension and New Application of Construction Professional Certificate; and
17. City / District Government Regulations on Licensing for Construction Services Business.

Foreign companies may use their own names for Representative Office and Joint Operation, whereas the name of a Joint Venture Company is regulated by the provisions in the Act on Limited Liability Company. Joint ventures should be in the form of Limited Liability Enterprise (*Perseroan Terbatas* - PT), where not more than 49% of the capital share of the may be owned by foreign partner(s).

Subject to Indonesian Labour and Immigration Laws and Regulations, only directors, managers and technical experts/advisors, unless mentioned otherwise, are allowed to stay for two years and could be extended for a maximum two times subject to two years extension each time. Manager and technical experts (intra-corporate transferees) are allowed based on an economic needs test. The entry and temporary stay of business visitor(s) is (are) permitted for a period of 60 days and could be extended maximum for 120 days.

Any foreign natural persons supplying services are subject to charges levied by Governments Labour Laws and Regulations. Any expatriate employed by a joint-venture

enterprise, representatives' office, and/or other types of juridical person and/or an individual services provider must hold a valid working permit issued by the Ministry of Manpower and Transmigration.

3.5. Lao PDR

3.5.1. Laws and Regulations

At the time of writing there is no specific law regulating the engineering profession in Lao PDR. However, the Professional Regulatory Authority (PRA) in Lao PDR is the Council of Sciences and Technology (CST) of the Ministry of Public Works and Transports (MPWT). The CST is a statutory body established by the decision of the Minister of PWT to administer and monitor the implementation of policies, strategies and law enforcement in the fields of public works and transport and undertake accreditation of architects and engineers.

3.5.2. Professional Association

The main professional association is the Association of Lao Architects and Civil Engineers (ALACE). There are 3 categories of ALACE membership: full members, supporting members and honorary members. A Lao Engineering Association will be established separately from ALACE in the future.

3.5.3. Qualifying as a Professional Engineer

A person may qualify as an engineer if the person obtains a degree with at least 5 years instructions from the National University of Laos or other recognised foreign universities.

As Lao PDR does not have any domestic regulations governing the engineering profession, the membership requirement in ALACE may provide a model for the core competency in engineering profession in the country. A Full Member of ALACE must be a Lao citizen or a permanent resident in Lao PDR, holding at least a bachelor degree in civil engineering, and be a practicing professional in civil engineering. In making an application for admission as a full member of ALACE, the applicant is also required to provide a summary of previous experience together with a copy of degree certificate.

3.5.4. Setting-up an Engineering Practice

To set-up an engineering practice, an engineer may register the business with the Enterprise Registry at the Ministry of Industry and Commerce. There is no additional requirement to set up a consulting firm. The same procedure applies to any foreign professional who wishes to practice in Lao PDR. However, all engineering design works must be signed or certified by a local engineering firm. A foreign engineering firm who works on projects funded by international institutions is encouraged to collaborate with local firms or local engineers.

Entry and stay of professionals are subject to Immigration regulations and to the labour law and regulations of the Ministry of Labor and Social Welfare. Endorsement of the respective departmental authorities is also required.

3.6. Malaysia

3.6.1. Laws Governing Engineering Profession

The engineering professional in Malaysia is governed by the Board of Engineers Malaysia (BEM) as provided for by the Registration of Engineers Act 1967 (Rev. 2007) and the regulations under the Act including the Registration of Engineers Regulations, 1990 (Rev. 2003); and the BEM Guideline Code of Professional Conduct, 2005.

The Act aims to provide protection to the public from the perspective of public safety, health and welfare by providing mechanisms for registration of professional engineers in Malaysia and the issuance of licence to practice as a professional engineer in Malaysia.

Thus, one of the main purposes of the Act is to ensure that only persons meeting the requirements may register as engineers and practice as engineers. The Act requires registration of engineers with BEM. It is clearly stated that *“No person shall, unless he is a Professional Engineer practice, carry on business or take up employment which requires him to carry out or perform professional engineering services”*. It is also stated that *“A Graduate Engineer may, subject to section 8, take up employment which requires him to perform professional engineering services”*

The Act further states that *“No person shall employ a person, sole proprietorship, partnership or body corporate, other than a registered Engineer or an Engineering consultancy practice, to perform professional engineering services.”*

Malaysia is also a signatory of the Washington Accord, and therefore the qualifying degrees will have to comply with the terms of the Washington Accord.

3.6.2. Engineering Bodies in Malaysia

There are several engineering bodies in Malaysia. To name a few they include:

1. The Institution of Engineers, Malaysia (IEM), which main objective is to promote and advance the science and profession of engineering in Malaysia;
2. Association of Consulting Engineers Malaysia which main objective of the association is to promote the advancement of the profession of consulting engineering. The Association also works to ensure that consulting engineers undertaking the advisory work in engineering are fully qualified engineers in the respective fields.
3. Engineering Accreditation Council of Malaysia (EAC), which is the only recognised accrediting body for engineering degree programs offered in Malaysia under the Washington Accord.

3.6.3. Qualifying as an Engineer

There are two levels of engineers entitled for registration with the BEM, one is the Graduate Engineer and another is the Professional Engineer.

3.6.3.1. Graduate Engineer

To apply for the registration as a Graduate Engineer, the applicant must be a Malaysian citizen or permanent resident of Malaysia. The applicant must be hold an engineering degree accredited or recognised by the EAC or, if the applicant holds a degree from abroad, the recognition of the degree will be based on accreditation

given by professional bodies who are signatories to Washington Accord. If the country is a signatory member of the Washington Accord, EAC will recognise the program based upon the recognition given by the accrediting body of that particular country. If the country is a provisional member of the Washington Accord, EAC will recognise the program on a case by case basis based upon the recognition given by the accrediting body of that particular country.

Washington Accord only recognises a 4 year engineering degree and any candidate who goes through any degree program less than the required time (e.g. 3 years) must enrol in courses at the Masters level at an accredited university to enhance the subjects studied at the first degree level.

Upon registration the applicant will be placed in the branches of the engineering profession stated in the applicant's basic degree.

Applications may be submitted manually using Form A or through MyBEM Online Registration System. The applicant will have to pay registration fee of RM50. The applicant must also submit the following supporting documents:

- a. A copy of the National Registration Identity Card;
- b. Certified Copy of the degree;
- c. Certified Copy of the full official transcript or details of all courses and subjects undertaken at the university;
- d. Certified Copy of diploma or matriculation and transcript if relevant.

Copies of foreign degree certificates not in English language must be accompanied by an English language or *Bahasa Melayu* translation. If the degree certificate does not state the branch of engineering profession, the applicant is required to enclose details of the subjects taken during his course. Every document submitted must be certified as a true copy by a Professional Engineer who is registered with BEM only. Upon approval, which is normally within 4 months of the date BEM the completed application, BEM will issue a certificate of Graduate Engineer registration.

BEM requires Graduate Engineers who wish to sit for the Professional Assessment Examination (PAE) to undergo practical training which is effective date is the date of registration as a Graduate Engineer. Under Regulation 22(1) of the Registration of Engineers Regulations 1990, the period of training is 3 years and must be carried out to the satisfaction of BEM.

The fields of training include:

- a. planning, design, execution or management of such works as comprised within the profession of engineering;
- b. engineering research; or
- c. teaching in a course leading to a qualification in engineering, research or in the teaching in a course leading to a qualification approved by BEM.

At least one year of such practical experience shall be obtained in Malaysia under the supervision of a registered Professional Engineer of the same discipline or an approved allied discipline and shall be in fields of engineering practice other than in research or teaching. BEM may exempt in whole or in part the requirements for the practical experience to be obtained in Malaysia or be supervised by a registered Professional Engineer in Malaysia provided that the total practical experience obtained is not less than 3 years.

Where there is no Professional Engineer of the same or allied discipline as the candidate in the organisation in which the candidate is working, he may seek the approval from BEM to obtain a Professional Engineer from outside his organisation to supervise his training.

3.6.3.2. Professional Engineer

Those seeking to be recognised as a professional engineer in Malaysia must satisfy certain requirements. Such requirements are:

- a. The applicant must be registered as a Graduate Engineer with BEM;
- b. The applicant must have met all the required training requirements of BEM in the same field or branch where the applicant is registered as a Graduate Engineer;
- c. The applicant must have passed the Professional Examination (PAE) of BEM or has been elected as a Corporate Member of the IEM.
- d. The applicant must have been residing in Malaysia for a period of not less than 6 months immediately prior to the date of filing the application with BEM.

Manual applications may be made using Form B1, together with supporting documents and processing fee of RM50 and registration fee of RM300. Applications may also be submitted "on-line" through MyBEM Online Registration System. Supporting documents include:

- a. Original Certificate (s) of Training;
- b. A copy of the BEM's letter certifying the applicant has passed the PAE or a copy of the IEM certificate certifying that the applicant is a Corporate Member;
- c. A copy of the degree certificate;
- d. A copy of the registration letter as a Graduate Engineer with BEM;
- e. A copy of the birth certificate and/or identity document; and
- f. Passport size photo.

All photocopied documents submitted together with this application must be certified-true-copy by a registered Professional Engineer.

The Certificate of Training must be on the letterhead of the relevant government department or company addressed to the Registrar of BEM. The Certificate must state the period of practical training, position held and summary of work undertaken by the applicant and be certified by Professional Engineer or Engineers who supervise the applicant's training, stating the name and the registration number and the branch of engineering the supervisor is qualified in.

Those for are involved in teaching profession must have undergone at least 1 year of industrial training under the supervision of a Professional Engineer in the same branch or engineering as that practiced by the applicant.

Those who have had experience in more than one department or company in the 3 years of training are required to submit two or more certificates of training certified by the respective registered Professional Engineer who supervises the applicant.

Upon approval, BEM will issue a Certificate of Professional Engineer Registration.

3.6.3.3. PAE Examination

A Graduate Engineer may submit an application to appear for PAE at any time through Form G together with a fee of RM200.

The examination will be conducted by two examiners, a Principal Examiner appointed by BEM and a Second Examiner appointed by the Principal Examiner. The examiners must come from the same or approved allied discipline as that of the candidate. The Principal Examiner will inform the candidate of the date, address of the place the candidate is required to submit the documents for the examination and the date of the PAE.

Every candidate for the Examination is required to submit 2 copies of a typewritten report, giving an account of his training and experience; and 1 copy of other documents and/or drawings, certified by a Professional Engineer who is in a responsible position as the employer or the principal for whom or under whom it was prepared. The drawings and documents submitted must be related to the work of the candidate in the ordinary course of the person's employment.

In the case of overseas experience, the drawings and documents may be signed by a Professional Engineer. If only a portion of the documents is prepared by the candidate, this must be clearly indicated and initialled by the Professional Engineer.

The report on training and experience should be of length 1500 - 2000 words and will include:

- a. Organisations in which the candidate has worked (in chronological order) together with the positions held.
- b. The duties and responsibilities in each organisation together with the works done/projects undertaken and training undergone should be stated.
- c. The actual involvement of the candidate in the projects undertaken and experience gained is to be emphasised.
- d. A summary of the total time spent (since registration as a Graduate Engineer) on the following aspects office/design work, site/field experience, planning/management, and others such as research and teaching.

Documents or Drawing

1. The candidate may submit at least 2 but not more than 4 working drawings which relate to candidate's own works, together with detailed design calculations prepared by him relating to one or more of the drawings; specifications and a set of quantities, comprising abstract, take-off sheets or shop list all prepared by him relating either to one of the drawings, or to other drawings which must also be submitted. A candidate may submit an additional drawing not necessarily prepared by him, to illustrate his experience in engineering works.
2. In the alternative, a candidate may submit part of a feasibility study involving functional and economic comparison of the preliminary designs of an engineering system, or a comprehensive report of a major engineering project, or a system design of a major engineering works. The feasibility study may include the following:
 - a. At least one relevant drawing showing essential features of details of the project or system;
 - b. Where appropriate at least three and not more than six sketches containing sufficient details to enable a draughtsman to work them up into working drawings without further guidance;
 - c. Preliminary stress or system analysis, where applicable, and;
 - d. Quantities, cost analysis or economic analysis as appropriate.

3. In the alternative, for a candidate whose experience is in the installation or operation or maintenance of an engineering plant or engineering system, the candidate may submit a detailed description of the installation or operation or maintenance of the plant or system together with the appropriate schedule which he has formulated. In his submission, he should clearly indicate:
 - a. His contribution which shows application of sound engineering principles.
 - b. A critical appraisal of the design of the engineering system which may not necessarily be the work of the candidate.
 - c. Details of modifications, if any, made to the existing system as a result of the work of the candidate should also be submitted.
4. For a candidate engaged in research and teaching, the candidate may alternatively submit two copies of a report of not more than 4000 words in evidence of the research carried out by him. The report should include a brief summary of the candidate's research work, stating the subject matter and objectives, together with a list of any papers published. A thesis prepared for a higher degree is not acceptable but the candidate may include the matter of the thesis together with the new matter.

The following are requirements on submission of documents specified for various engineering branches:

- **Aeronautical**
Drawings and calculations for the design, in whole or in part, of an aircraft or guided missile, or the estimation of the performance of its engines or its structure, maintenance schedules for commercial airlines or the armed services; and notes or records such as wind tunnel tests on models of aircraft or on parts thereof; flights trials; strength tests on wings or other components; vibration and stiffness tests; methods of construction and joining parts.
- **Agricultural**
Drawings and calculations for the design, in whole or in part, of an item of work related to agricultural engineering such as agricultural machinery, agricultural operations, irrigation schemes, drainage schemes and flood mitigation works; and notes or records on operation and maintenance of agricultural equipment, planning of agricultural operations, feasibility report on drainage, irrigation or flood mitigation project.
- **Chemical**
Drawings and calculations for the design, in whole or in part, of an item of work relating to chemical or process engineering, e.g. heat exchangers; absorption towers; distillation plant; liquor filters; gas degusting equipment; plant layouts; and notes or records such as the operation and/or testing of chemical plant and items of equipment; the preparation of process flow sheets showing heat and mass balances; maintenance and planning coordination; the economic assessment of alternative schemes; the instrumentation and automatic engineering techniques.
- **Civil**
Drawings and calculations for the design of a civil engineering work; and a set of quantities to the drawings or, if this is not possible, quantities taken by the candidate from drawings not prepared by him will be accepted and in this case, a tracing or print of the drawings should be attached. Instead of quantities,

records of fieldwork, soil investigations and laboratory tests, schedule of materials, survey, statistical analysis and other data for specialised areas of study may be submitted. The specialised areas by which the civil engineer wishes to be examined may be in one or more of the following:

- a. Drainage, Irrigation and Flood Mitigation;
Drawings and calculations for the design of a Drainage, Irrigation or Flood Mitigation System; and Records of Field Work in Drainage, Irrigation or Flood Mitigation Works
- b. Hydrology and other areas in water resources
Drawings and calculations and quantities for the design of an item of work relating to hydrology, e.g. river gauging stations, lysimeters or percolation gauges, climatological stations; test wells; and Records of fieldwork in surface of ground water hydrology; statistical analysis of hydrological data leading to the evaluation of water resources; methods of flood and drought forecasting.
- c. Geotechnical, Soil & Rock Mechanics
Drawings and calculations for the design of a project involving soil or rock mechanics, such as the stability of a dam and the adjoining valley; the stability and anticipated settlement of buildings; retaining walls, railway embankments, etc.; and Notes and records from site investigations; field and laboratory test; trial sections etc. for the purpose of the foregoing
- d. Public Health and Environmental
Drawings and calculations for the design of a works related to any branch of public health engineering. e.g. water supply treatment, sewerage and sewerage treatment; land drainage and river improvement; refuse disposal plants, noise pollution, dust pollution, radiation pollution; and Notes and records of a field study for a public health and environment engineering project.
- e. Permanent Way
Drawings and calculations for the detailed design of a major junction layout with a schedule of material; details of timbering and programme for carrying out the work; and Notes or records such as the survey for and setting out of a layout; investigation into the strength or stability of tracks, assessment of permissible speeds.
- f. Roads, Highway and Transportation
Highway: Drawings, calculations and quantities to show adequate knowledge of the practical application of the theory of civil engineering design in relation to highway engineering e.g. the design of bridges, retaining wall, earthworks, paving and drainage; and notes or records on highway capacity standards in relation to estimated traffic volumes with particular reference to junction layout; highway materials and pavement design; road location in urban or rural areas.
Transportation: Drawings, diagrams and appropriate calculations to show adequate knowledge of the application of the principles of transportation engineering to practical problems and of the use of current techniques in the analysis and planning of transport systems; and statistical analysis of data derived from traffic studies; economic factors in relation to a transportation scheme; the functional design of terminal facilities for road, rail or air transport; design and operation of traffic management schemes; the function design of road or rail networks; the design of traffic signal systems.
- g. Town Planning
Drawings and maps, written statement, and report of the surveys which have been prepared for submission to the appropriate authority in the form

of a Development Plan under the Town and Country Planning Act, or similar legislation; and notes on the factors governing the proposals for population densities, zoning, communications, and basic layout.

- **Electrical, Electronic and Communications**

Drawings, charts, calculations for the design, installation, construction and operation in whole or in part of a system or an item of work related to electrical engineering, for example, utilisation of electric plant and equipment such as generating plant, switchgear, transformers, substations, transmission and distribution, electric drive, lighting systems; and notes or records on operation, maintenance, testing of electrical plant and equipment or telecommunication equipment; generation, transmission and distribution of power; application of electricity to transport, industry, radio broadcasting, commercial and domestic premises, etc.

- **Gas**

Drawings and appropriate calculations, including:

- a. Basic considerations for design of an item of work related to gas engineering, e.g. gas work plant in general; gas transmission or distribution system; boosting, storage and control equipment; gas-consuming units - domestic, commercial or industrial; and
- b. A record of some particular practical work in the field, such as the operation of a gas-making plant and the evaluation of any special features; the installation of a gas-transmission pipeline; and the performance of a gas-fired industrial furnace for a specific duty.

- **Marine**

Drawings and calculations for the design in whole or in part, of an item of work related to marine engineering, such as steam or internal combustion propulsion; or auxiliary machinery, such as electrical generating sets; and notes or records, such as the operation or testing of one or more of the foregoing.

- **Mechanical**

Drawings and calculations for the design of an item of work related to mechanical engineering, such as machinery or machine parts; power-house or machine-shop equipment; factory or workshop layouts; earth moving and quarry plant, compressed air equipment, diesel traction units, pumps, engines, air conditioning systems, fire-fighting systems, other building services, etc. and notes or records on methods of machinery: accuracy, workmanship, tolerances; testing properties of materials; performance of tests on plant and machines; workshop organisation; maintenance; work study, etc.

- **Mining**

Drawings and calculations relating to a mining or metallurgical project such as shaft design; winding or haulage systems; design of underground or open pit working; gravel pump and dredge operations; a major ventilation survey; items of metallurgical plant connected with crushing or dressing or extractive metallurgy; coal preparation plant; and notes or records on the operation or testing of mining or metallurgical plant and equipment, such as power loaders; high-speed tunnelling equipment; fire-fighting ranges and equipment; pumping equipment; crushing and floatation equipment; furnaces, electro-metallurgical and hydro- metallurgical plant.

- **Naval Architecture and Shipbuilding**
Drawings and calculations for an item of work relating to a design study for a modern ship; the launching of a large ship; a typical ship system, e.g. oil fuel, ballast, fresh and salt water, ventilation and air-conditioning; cargo handling; and notes or records such as estimate of ship performance including model tests and propeller design; trials at sea, e.g. propulsive performance, sea keeping, vibration, planning, production; and quality control applied to shipbuilding.
- **Petroleum**
Drawings and appropriate calculations, including basic considerations for design of an item or work related to petroleum engineering, e.g. petroleum production plant in general; petroleum distribution system; production enhancement process; reservoir planning; storage and control equipment; petroleum consuming units; and notes or records of some particular practical work in the field such as the operation of petroleum production platform; installation of petroleum distribution pipeline; performance of oil-fired equipment and reservoir operations.
- **Production Engineering**
Drawings and calculations for the design of an item of work related to production engineering, e.g. machine tool engineering; factory layout and material handling; work analysis; manufacturing system, automations, etc. and notes or records such as design for production; forming processes; quality and reliability; techniques of operational research; production cost analysis; human aspects and industrial safety consideration.

PAE will consist of professional interview, followed by written examination. The professional interview involves assessment of the candidate's practical experience, on the basis of both time and quality. Candidates will be examined on the understanding of the application of engineering principles to solve problems arising from the investigation, planning, design, construction, operation or maintenance of engineering works; or on the subject of the candidates' research; and the ability to communicate.

In addition, candidates will be required to write two essays, one from Section A (related to the candidate's training and experience as stated in his report) and another from Section B on the Code of Ethics. The essays are intended primarily to test the candidates' ability to marshal his knowledge and thoughts and to express them in words in a clear and concise manner.

Candidates will be informed of the result of the examination within 4 four months of the date of the examination. Every unsuccessful candidate shall be informed of the reasons for the failure. The unsuccessful candidate may appeal to BEM within 21 days of being informed of the result and every appeal shall be accompanied by a payment of RM150.00 which shall be refunded in the event that the appeal is successful.

A candidate who has failed in the Examination may re-sit the examination only after 6 months from the date of the last examination.

3.6.4. Temporary Registration of Foreign Engineers

A foreign engineer²⁰ who takes-up employment as an engineer in Malaysia must apply for registration as a Temporary Engineer, which is subject to the following conditions:

- a. The applicant possesses the necessary qualification which is recognised for the practice of engineering as a professional engineer in the country where he normally practices;
- b. The applicant possesses the necessary expertise of a minimum of 10 years' experience in the field the applicant intends to practice;
- c. The applicant's physical presence is required in Malaysia for not less than 180 days in a calendar year;
- d. The applicant is employed as an engineer and has been assigned to specific project by a particular company;
- e. The applicant is sponsored by a local Professional Engineer in the company which offers the applicant the assignment; and
- f. The applicant is to train assigned local Graduate/ Professional Engineers who become the applicant's understudy in the applicant's area of expertise.

Any application for a Temporary Engineer must be made in Form B2, to be accompanied with the following supporting documents:

- a. A copy of the basic engineering degree certificate;
- b. A copy of the certificate of membership of professional bodies;
- c. Certificate of professional registration from the country where the application normally practices;
- d. Brief curriculum vitae (CV).

The applicant is required to pay processing fee of RM50.00 which is not refundable and registration fee of RM500.00. The applicant must be sponsored by the local Professional Engineer who offers the appointment. All copies of certificates referred to above must be certified as true copy by a local Professional Engineer.

Upon approval, BEM may issue a temporary registration for a period not exceeding 1 year which is subject to renewal. The certificate expires on 31st December of each year regardless of whether the project is completed or otherwise. The certificate will specify the conditions of the Temporary Engineer registration, including the branch of engineering he is registered and the project he is assigned to.

Unsuccessful applicant may file an appeal with the Minister within 21 days of receiving the notification of the refusal of registration.

A Temporary Engineer is only allowed to submit plans and drawings for the project the engineer is assigned to. A Temporary Engineer is also not allowed to take practice as a director or shareholder of a local company or firm practising as consulting engineers in Malaysia, nor is the person allowed to set up own consultancy practice in Malaysia. A Temporary Engineer is also not allowed to change jobs and if there is any job change, the person may submit a new application for registration.

The Temporary Engineer registration will lapse upon the completion of the project in which the foreign engineer is assigned to. The Temporary Engineer may be reassigned to another project upon application by the sponsor and upon receiving an approval from BEM.

²⁰ Foreign engineer means an engineer who is not a citizen or a permanent resident of Malaysia.

Every registered engineer including Temporary Engineer shall notify the Registrar of any change in his business address.

3.6.5 Setting-up an Engineering Practice

Professional engineers offering professional engineering service and engineering consultancy may set up practice by way of sole proprietorship, partnership, body corporate or multi-disciplinary practice and must be registered with the BEM.²¹

The law states that:

“Professional engineering services” means *engineering services and advice in connection with any feasibility study, planning, survey, design, construction, commissioning, operation, maintenance and management of engineering works or projects and includes any other engineering services approved by the Board*. “Engineering consultancy practice” means *a sole proprietorship, partnership or body corporate providing professional engineering service*.

An engineering consultancy practice may only provide professional engineering services in the branch or branches of engineering in which the sole proprietorship, partner or a member of the board of directors of that practice is qualified to practice and as is shown in the Register.

In Malaysia, formation of body corporate or otherwise generally known as companies is governed by the Malaysian Companies Act 1965. Non-body corporate such as sole proprietorship and partnerships are governed by the Registration of Business Act 1956 and Limited Liability Partnership (LLP) is governed by the Limited Liability Partnership Act 2012.

Under the Companies Act 1965, there could be three types of company namely company limited by shares, which is the most common; company limited by guarantee; and unlimited company.

Companies may be formed as either private companies or public companies. A private company is one which is prohibited by its articles of association to issue any invitation to the public to subscribe for shares or debentures of the company or to deposit money with the company. Shareholders/ members of a private company shall not be more than fifty.

LLP is a new business vehicle introduced by the Companies Commission of Malaysia (CCM) recently. It provides the public with more options to choose their business vehicle. An LLP is a hybrid between a company and a conventional partnership. An LLP is a separate legal entity from its partners. The liabilities of the partners of an LLP are limited while the LLP has unlimited capability in conducting business and holding property.

Two or more individuals or bodies corporate may form an LLP for any lawful business in accordance with the terms of the LLP Agreement. An LLP may also be formed for the purposes of carrying on professional services of which the partners must be natural persons of the same professional practice and have in force professional indemnity insurance approved by the Registrar.

²¹ The Registration of Engineers (Amendment) Act 2002 requires “every sole proprietorship, partnership or body corporate desirous of practicing as consulting engineers” to be registered with BEM.

All sole proprietorships and partnerships (excluding LLPs) are unincorporated and must be registered with the Registrar of Businesses also under the auspices of the CCM. As unincorporated entities, sole proprietorship and partnerships have unlimited liability.

- **Sole Proprietorship**

In the case of the sole proprietorship, the sole proprietor is a Professional Engineer. Application to register a sole proprietorship can be made either through MyBEM Online Registration System or by manual submission of Form E. The application must be accompanied by:

- Professor engineer certificate of the principal;
- Statutory declaration of the principal;
- Processing fee of RM50 and registration fee of RM1000.

BEM must be informed within 30 days of any change of ownership of the firm.

- **Partnership**

In the case of the partnership, all the partners are Professional engineers. Application to register a partnership can be made either through MyBEM Online Registration System or by manual submission of Form E. The application must be accompanied by:

- Professor engineer certificate of the partners;
- Statutory declaration of the partners;
- Processing fee of RM50 and registration fee of RM1000.

BEM must be informed within 30 days of any changes in the partnership.

- **Body Corporate**

An application to register a body corporate may be made either through MyBEM Online Registration System or through manual submission. The body corporate must have also been registered with the Companies Commission of Malaysia (CCM) (formerly known as the Registrar of Companies).

All application must be accompanied by the following supporting documents:

- a. Professional Engineer Certificate of the director and shareholders;
- b. Statutory Declaration of the directors and shareholders;
- c. Memorandum of Articles and Articles of Association must be in accordance with the standards adopted by BEM;
- d. The certified copy of the Registration Certificate from the Companies Commission of Malaysia (CCM);
- e. Register of Directors (Form 49) and the Register of Shareholders (Form 24) duly certified by the CCM;
- f. Documents proving that the paid-up capital of the body corporate is not less than RM50,000; and
- g. Processing fee of RM50 and registration fee of RM1000.

Form 49 and Annual Returns are required for renewal of permits.

- **Multidisciplinary Practice**

In the case of multidisciplinary practice of professional engineering services, architectural consultancy services and/or quantity surveying services, the conditions are:

- The body corporate that applies for registration under subsection (1) must be incorporated under the Companies Act 1965 and:-
 - has a board of directors comprising Professional Engineers, Professional Architects and/or registered Quantity Surveyor;

- has shares held by Professional Engineers, Professional Architects and/or registered Quantity Surveyor and any of the following persons and/or bodies corporate where; the Professional Engineers, Professional Architects, registered Quantity Surveyors, bodies corporate providing professional engineering services, bodies corporate providing Quantity Surveyors hold a minimum combined share of 70% of the overall equity of that body corporate, of which the Professional Engineers and/or bodies corporate providing professional engineering services hold a minimum share minimum share of 10% and architectural consultancy services and/or bodies corporate practicing as consulting.
- any other persons, including persons belonging to a profession allied to engineering, architecture or quantity surveying, being a profession approved in writing by the board regulating the profession of engineering, architecture or quantity surveying, respectively, hold a maximum share of 30% of the overall equity of the body corporate; and
- has a minimum paid-up capital which shall be an amount to be determined by the Minister.
- For multi-disciplinary practices (Architecture, Engineering and/or Quantity Surveying), foreign equity up to a maximum of 30 per cent for joint ventures by professionals who are registered in the country of origin. Foreign Directorship is not allowed.

Engineering services must be authenticated by a registered professional engineer in Malaysia.

BEM allows professional engineers to be directors or partners of more than one company/ firm practicing as consulting engineers. BEM deems that the involvement of a Professional Engineer in more than one company as an investment venture.

However, to maintain professionalism of the practice and recognising that a Professional Engineer has to give time and attention to clients and projects, a Professional Engineer who is a director of more than one ECP has to conform to the following conditions:

- He/ She can only actively practice in one engineering company / firm; and
- The second and the subsequent ECP cannot provide services in the branch of engineering in which he is registered unless there is at least another director of the same branch in the second and subsequent body corporate who is not actively practicing in any other ECP.
- A registered Professional Engineer who is not residing in Malaysia can be director of an ECP practicing as consulting engineers but due to his residential status, he cannot submit plans in Malaysia. Under the circumstances mentioned, the body corporate is required to fulfil the following conditions in order to be able to submit plans in Malaysia:
 - the majority of the directors of the ECP must be domiciled in Malaysia and
 - in the case where there are only two directors, one of them must be domiciled in Malaysia and the ECP can only practice in the branch of engineering of its domiciled directors.
- Foreign and local engineers cannot set up a joint venture ECP to practice as consulting engineers because foreign engineers are not allowed to be directors and shareholders of such ECP.
- Foreign and local engineers could however work in association with each other on a project-to- project basis, but the local consultants must be the lead consultant.

Sole proprietorships, partnerships or bodies corporate are allowed to merge and form new engineering consultancy practices which shall be registered by BEM provided that

the old bodies corporate cease to practice within six months from the date of approval of the new registration.

Foreign professionals require employment pass or professional visit pass, depending on the circumstances. The Professional Visit Pass is issued to foreigners employed by an overseas company but working with a company in Malaysia. This pass is normally appropriate for technical experts and trainees. The Professional Pass is normally valid for short periods of around six months. An employment pass applies to those seeking to work in Malaysia and who have specific skills, generally in technical or managerial positions. It is usually issued for a minimum period of two years.

- **Professional indemnity**

Professional engineers are expected to deliver their services within a certain standard and with duty of care as defined by the tort law. Professional engineers will have to take into account safety, health and welfare of the public when performing the duty and they are expected to only perform only in areas of competence. Professional engineers are expected to be faithful agent or trustee of the client and to avoid deceptive acts in solicitation of employment from clients.

Apart from the Registration of Engineers Act, professional engineers need to pay attention to other laws such as Street, Drainage & Building Act, the Construction Industry Development Board Act, the Health and Safety Act, the Housing Development Act, the Employment Act and the Contract Act.

Section 71 of the Street, Drainage & Building Act states that Where any building or part of a building fails in the course of construction or after completion etc. and such failures is due to misconstruction or lack of proper supervision during construction; misdesign or miscalculation; or misuse, the person responsible shall be liable on conviction to a fine not exceeding RM500,000 or to imprisonment for a term not exceeding 10 years or to both.

From the perspective of tort law, an engineer is expected to exercise the ordinary skill of an ordinary engineer exercising their particular art.

It can be concluded that engineers are required to be proficient in engineering practice, standards, code of practice and regulations. Even non-registered engineers who practice engineering will be subject to the same standard of duty of care under the tort laws. Once professional service is rendered, an engineer is liable even in the absence of a written contract or appointment.

Therefore it is important for professional engineers to be insured and covered by the professional indemnity insurance to provide protection against any potential liability claim.

- **Taxation rules in Malaysia**

A Resident individual is assessable on income derived from sources in Malaysia and income received in Malaysia from outside Malaysia. With effect from the assessment year 2004 income remitted into Malaysia from overseas by a resident individual is exempted from income tax.

A Non-Resident individual is assessable only on income derived from sources in Malaysia.

A Resident company is assessable on income derived from Malaysia and income remitted to Malaysia from sources outside Malaysia. Starting Year of Assessment 1995 onwards only income derived from Malaysia are taxable. A Non-Resident company is liable to Malaysian tax when it carries on a business through a permanent establishment in Malaysia and is assessable on income derived only from sources within Malaysia.

Professional service providers must also register with the Royal Customs and Excise Department for the Services Tax and commencing in April 2015 for the Goods and Services Tax (GST). GST shall be levied and charged on the taxable supply of goods and services made in the course or furtherance of business in Malaysia by a taxable person. GST is to be levied and charged on the value of the supply. GST can only be levied and charged if the business is registered under GST. A business is not liable to be registered if its annual turnover of taxable supplies does not reach the prescribed threshold.

3.7. Myanmar

3.7.1. Laws and Regulations

The main Law governing engineering profession in Myanmar is the Myanmar Engineering Council Law and the main professional regulatory authority is the Myanmar Engineering Council. The Myanmar Engineering Council Law was enacted on the 28th of November 2013. Apart from the above mentioned Laws and its related Myanmar Engineering Council Regulations, some departments and authorities retain certain power over certain categories of engineering practice. They have existing regulations and codes of practices. These include such as the Ministry of Rail Transportation which governs railways related engineering, the Ministry of Construction which deals infrastructure related engineering, the Ministry of Agriculture and Irrigation which deals with irrigation related engineering, the Ministry of Electric Power which deals with power distribution related engineering and City Development Committees such as Nay Pyi Taw, Yangon and Mandalay City Development Committees where engineering activities are governed regionally.

3.7.2. Professional Association

The professional association for engineers in Myanmar is the Myanmar Engineering Society (MES). The Myanmar Engineering Society actively participated in the development of the engineering profession in close collaboration with local and international organisation.

3.7.3. Qualifying as a Professional Engineer

Registration of engineers is being conducted in three levels, viz- registered engineer, registered senior engineer and professional engineer. A graduate engineer can apply to be registered as an apprentice engineer if the applicant has achieved an engineering degree from a recognized University.

Apart from the graduate engineer there are also Graduate Technicians (B.Tech.) and also Technicians Diploma (AGTI) holders who are also given opportunities to enter the pathway to Professional Engineer (P.E.) level.

To become a Professional Engineer, a Graduate Engineer must fulfil the following criteria:

- a. At least 2 years of general training that provides a sound basis for professional development;
- b. 5 years of professional career development and training providing wide exposure to the managerial and technical expertise in engineering practice;
- c. At least one year of the training mentioned in (a) and (b) above must be obtained in Myanmar under the supervision of a Professional Engineer in the same branch of engineering as that practiced by the Graduate Engineer although Professional Engineers in other related branches of engineering may be accepted with the prior approval of the Council; and
- d. The Graduate Engineer must have satisfactory attendance in courses and professional development programmes determined by the Council, and conducted by the Council or Institutions approved or accredited by the Council.

The Council may provide whole or partial exemption or enhance the requirement for any Graduate Engineer as to the practical experience required to be obtained in Myanmar or to the requirement as to the supervision by a Professional Engineer in Myanmar.

A Graduate Engineer applying for registration as a Professional Engineer shall submit with his application to become a Professional Engineer, his proof of practical experience including details and description of the practical experience and a statement by the Supervisory Senior Engineer in the case the experience is obtained in Myanmar or by an engineer acceptable to the Council in the case the experience is obtained outside Myanmar that the Graduate Engineer has satisfactorily completed his practical experience.

Professional experience and competency report consists of:

- a. Apply engineering knowledge, methods and techniques: This generally relates to solving engineering problems using appropriate theoretical and practical engineering principles;
- b. Use of engineering technology, tools and equipment: This involves using appropriate technology and engineering tools based on sound understanding of engineering principles;
- c. Safeguard public safety: This relates to practices of engineering activities relating to safety, health and welfare of the public, the protection of the environment and the safeguarding of economic interests;
- d. Recognise the impacts of engineering on the environment, economy and society: This part involves developing engineering solutions that are based on a sound understanding of their impacts on the environment, society and the economy;
- e. Manage engineering activities: In this field the candidate is to show his capabilities in applying the principles of sound management when conducting engineering activities including engineering works;
- f. Communicate engineering information, where candidates are to show effective communication of engineering information verbally, graphically and in writing;
- g. Working collaboratively where candidates are to show that they can work effectively to achieve societal, organizational and project goals in a collaborative manner; and
- h. Maintain and enhance engineering skills and knowledge, where candidates show how to take actions to maintain and enhance proficiency in the practice of engineering activities.

Professional Development Program consists of the following subjects:

- a. Engineering management;
- b. Safety;
- c. Ethics;
- d. Fundamentals of Engineering;
- e. Rules, Regulations, Standards and Specification; and
- f. Professional Topics.

The Professional Assessment Examination for Graduate Engineers to become a Professional Engineers consists of:

- a. Professional interview conducted by not less than 3 members where one member must be a Council member appointed by the Council;
- b. Examinations on any relevant subject related to the practical experience that the candidate has obtained;
- c. A written paper on the understanding of the Code of Professional Conduct; and
- d. Any other examination, written or otherwise to be determined by Council.

3.7.4. Setting-up an Engineering Practice

Under the Myanmar's commitment in AFAS, in relation to engineering services, Myanmar allows commercial presence of foreign suppliers and/ or providers under the latest Union of Myanmar Foreign Investment Law and the Myanmar Companies Act.

Foreign Engineers who want to provide Engineering Services are also required to comply with other Myanmar Laws and Regulations which generally apply to all foreigners who work in Myanmar. Engineers (Non-Citizen of Myanmar) must be registered with Professional Bodies of his/her home country. Registration will be based on project to project basis.

- **Registration of Foreign Engineers**

A foreign engineer who takes up employment as an engineer in Myanmar must apply for registration as an Engineer, which is subject to the following conditions:

- a. The applicant possesses the necessary qualification which is recognised for the practice of engineering as a professional engineer in the country where he normally practices; and
- b. The applicant possesses the necessary expertise of a minimum of 8 years' experience in the field the applicant intends to practice; and
- c. the applicant's physical presence is required in Myanmar for not less than 180 days in a calendar year;
- d. the applicant is employed as an engineer and has been assigned to specific project by a particular company;
- e. the applicant is recommended by a Myanmar Professional Engineer of the relevant project which the applicant is assignment; and
- f. the applicant is assigned to attach with the Myanmar Professional Engineer.

The applicant is required to pay processing fee of USD () which is not refundable and registration fee of USD (). All copies of necessary certificates as true copy must be certified by a Myanmar Professional Engineer for submission to Myanmar Engineering Council.

Upon approval, the Council may issue a temporary registration for a period not exceeding 1 year which is subject to be renewed every six months. The certificate expires on 31st December of each year regardless of whether the project is completed or otherwise. The certificate will specify the conditions of the Engineer registration, including the branch of engineering he/she is registered and the project he/she is assigned to.

Unsuccessful applicant may put up an appeal with the Council within 21 days of receiving the notification of the refusal of registration. The Council will reconsider his/her application.

An Engineer is only allowed to submit plans and drawings for the project the engineer is assigned to. An Engineer is also not allowed to take practice as a director or shareholder of a local company or firm practising as consulting engineers in Myanmar, nor is the person allowed to set up own consultancy practice in Myanmar. An Engineer is also not allowed to change jobs and if there is any job change, the person may submit a new application for registration.

The Engineer registration will lapse upon the completion of the project in which the foreign engineer is assigned to. The Engineer may be reassigned to another project upon application according to the Myanmar Engineering Council Rules & Regulations.

Every registered engineer shall notify the Registrar of any change in his business address.

- **Registered Foreign Professional Engineer (RFPE)**

As per ASEAN Mutual Recognition Arrangement (MRA) on Engineering Services signed on December 9, 2005 at the 11th ASEAN Summit in Kuala Lumpur and also as per our Myanmar Engineering Council Law and Myanmar Engineering Council Regulations, Myanmar will register the ACPE holder of any ASEAN member state as a Registered Foreign Professional Engineer (RFPE) after assessing his/her application.

A Registered Foreign Professional Engineer (RFPE) may be permitted to work, not as an independent practitioner, but in collaboration with a designated Myanmar Professional Engineer subject to appropriate domestic professional regulatory laws.

3.8. The Philippines

3.8.1. Laws and Regulations

The licensing bodies for the engineering professions in the Philippines are the various Professional Regulatory Boards of Engineers under the Professional Regulation Commission (PRC). The PRC is a statutory body under the Republic Act No. 8981 (PRC Modernization Act of 2000) which is responsible for the administration, implementation and enforcement of regulatory policies on the regulation and licensing of various professions and occupations under its jurisdiction. The engineering profession in the Philippines cover the following:

1. Aeronautical Engineering;
2. Agricultural Engineering;
3. Chemical Engineering;
4. Civil Engineering;
5. Electrical Engineering;
6. Electronics Engineering;
7. Geodetic Engineering
8. Mechanical Engineering
9. Metallurgical Engineering;
10. Mining Engineering;
11. Naval Architecture and Marine Engineering; and
12. Sanitary Engineering

The domestic regulations for the engineering profession in the Philippines are:

1. Aeronautical engineering PD No. 1570;
2. Agricultural Engineering RA No. 8559;
3. Chemical Engineering RA No. 9297;

4. Civil Engineering RA No. 544;
5. Electrical Engineering RA No. 7920;
6. Electronics Engineering, RA No. 9292;
7. Geodetic Engineering, RA No. 8560;
8. Mechanical Engineering, RA No. 8495;
9. Metallurgical Engineering RA No. 8495;
10. Mining Engineering RA No. 4274;
11. Naval Architecture and Marine Engineering RA No. 4565; and
12. Sanitary Engineering RA No. 1364

Other professional activities not specifically within the defined scope of practice by the Professional Regulatory Laws of the 12 engineering professions shall be referred to the AMCESP for determination whether the activity may be divided or broken down so as to qualify the same under the existing regimes.

3.8.2. Professional Associations

Each of the professions has a corresponding accredited professional organisation (APO) which provides assistance and coordination with PRC in matters relating to professional practice. The regulated engineering professions and corresponding APOs are listed as follows:

1. Aeronautical Engineering: Society of Aerospace Engineers of the Philippines (SAEP);
2. Agricultural Engineering: Philippine Society of Agricultural Engineers (PSAE);
3. Chemical Engineering: Philippine Institute of Chemical Engineers (PChE);
4. Civil Engineering: Philippine Institute of Civil Engineers (PICE);
5. Electrical Engineering: Institute of Integrated Electrical Engineers (IIEE);
6. Electronics Engineering: Institute of Electronics and Communications Engineers of the Philippines (IECEP);
7. Geodetic Engineering: Geodetic Engineers of the Philippines (GEP);
8. Mechanical Engineering: Philippine Society of Mechanical Engineers (PSME);
9. Metallurgical Engineering: Society of Metallurgical Engineers of the Philippines (SMEP);
10. Mining Engineering: Philippine Society of Mining Engineers;
11. Naval Architecture and Marine Engineering: Philippine Association of Naval Architects and Marine Engineers (PANAME); and
12. Sanitary Engineering: Philippine Society of Sanitary Engineers (PSSE).

3.8.3 Qualifying as an Engineer

A professional in the Philippines is defined as a person who:

- a. has completed a prescribed five (5) years university course/degree;
- b. passed a licensure examination/has been issued a Certificate of Registration/ Professional ID Card/ Professional Tax Receipt (PTR);
- c. is a member of good standing of an accredited professional organisation (APO);
- d. follows a set of standards/code of practice; and
- e. adheres to professional code of ethics.

Each charter of the regulated professions provides, among others, the definition, licensing requirements, admission requirements, foreign reciprocity/qualifications and corporate practice.

The core competencies of each engineering discipline are shown below:

- **AERONAUTICAL ENGINEERING**

To qualify as an aeronautical engineer in the Philippines, a person must be:

- At least 21 years of age;
- Citizen of the Philippines or of foreign country qualified to take exams under existing laws;
- Good moral character/ reputation;
- BS Aeronautical Engineering from government recognised institution or equivalent course in a foreign institution, subject to existing laws; and
- Has not been convicted of crime involving moral turpitude. Citizens of a foreign country may take the licensure exam under existing laws.

To be recognised as a professional aeronautical engineer, a person must have passed the professional examinations, consisting of:

- **AERODYNAMICS:** To determine the basic knowledge of the Examinees in the Fundamentals of Aerodynamics and Applications to Aircraft.

Subject Contents:

1. Standard Atmosphere
2. Fluid Laws
3. Aircraft Classification and Operating Principles
4. Airplane Aerodynamics
5. Helicopter Aerodynamics
6. Wind Tunnels

- **AIRCRAFT STRUCTURES AND DESIGN:** To determine the basic knowledge of the Examinees in Structural Analysis and Design of Aircraft.

Subject Contents:

1. Fundamental Principles
2. Aircraft Design Configuration
3. Structural Loading Conditions
4. Structural Analysis and Design

- **AIRCRAFT CONSTRUCTION, REPAIR, AND MODIFICATION:** To determine the basic knowledge of the Examinees on Aircraft Materials, Construction Repair, and Modification

Subject Contents:

1. Aircraft Materials and Processes
3. Construction, Repair, and Modification
4. Testing and Inspection
5. Corrosion Protection and Control
6. Aircraft Weight and Balance

- **ENGINEERING ECONOMICS AND MANAGEMENT, LAWS AND ETHICS:** To determine the basic knowledge of the Examinees in Aeronautical Engineering Law and Ethics, and the Principles of Engineering Economics and Management with Aeronautical Engineering Applications

Subject Contents:

1. Engineering Law and Ethics

- **MATHEMATICS:** To determine the basic knowledge of the Examinees in Mathematics as an indispensable tool in Aeronautical Engineering Computations

Subject Contents:

1. Algebra and Trigonometry
2. Analytic Geometry
3. Differential Calculus, Integral Calculus, and Differential Equations

Temporary Certificate of Registration or Special Permit may be granted to the following: Legally or technically qualified foreign aeronautical engineers called in for consultation, specific design, construction; or technical officers or professors in specialised branches of aeronautical engineering considered necessary or indispensable for the country.

A firm, company, corporation may engage in designing, planning, construction, installation, alteration, manufacture or marketing of any aircraft, its components, accessories, instruments, equipment & supply provided there is certification, supervision or guidance of an aeronautical engineer.

- **AGRICULTURAL ENGINEERING**

To qualify as an agriculture engineer in the Philippines, a person must be:

- (a) Citizen of the Philippines; and
- (b) Holds BS Agricultural Engineering or equivalent in CHED recognised institution.

The person must also sit and pass professional examinations set by the PRC. The examination for agricultural engineering shall basically cover the following subjects:

- (1) Agricultural mechanisation, power, machinery and equipment;
- (2) Soil and water conservation, irrigation and drainage; and
- (3) Rural electrification, agricultural processing and agricultural structures.

Foreign agricultural engineers may be issued temporary license to practice / engage in consultancy if the home country of the foreign engineer permits Filipino professionals to practice within its territorial limits on same basis as subjects or the citizens of such foreign country.

- **CHEMICAL ENGINEERING**

To become a professional chemical engineer, an applicant must fulfil the following conditions:

- Be a Citizen of the Philippines;
- Has obtained a BS Chemical Engineering or its equivalent from a government-recognised school / institute /college / university; and
- Has passed a professional examination set by the PRC as explained below.

PHYSICAL AND CHEMICAL PRINCIPLES

- A. General Inorganic Chemistry: Matter and energy, theory of atoms and molecules, chemical periodicity, calculation principles in chemical changes, chemical bonding, solutions, chemical equilibrium, chemical kinetics, and basic nuclear chemistry.
- B. Organic Chemistry: Structural characteristics and reaction mechanism of different organic compounds: aliphatic, aromatics, arenas, alcohols, aldehydes, ketones, carboxylic acids, carbohydrates, amino acids, and proteins.
- C. Analytical Chemistry: Theory and practice of gravimetric and volumetric methods of analysis and their application methods in the analysis of acids, bases, salts, and minerals.
- D. Physical Chemistry: Properties of gases, liquids, solids and solutions; introduction to first and second laws of thermodynamics; thermochemistry; homogeneous and heterogeneous equilibria; transference and conductance of

- ionised solutions; and electrochemistry; solid chemistry and quantum mechanics chemistry; reaction kinetics for air, water and solids;
- E. Chemical Engineering Thermodynamics: First and second laws of thermodynamics, P-V-T relationships of fluids, heat effects, thermodynamics of flow processes, power and refrigeration cycles, phase equilibria, and chemical reaction equilibrium.
 - F. Biochemistry – advanced organic chemistry of proteins, carbohydrates, stem cell technology, biochemical kinetics, molecular biochemistry and kinetics; biomedical applications;
 - G. Environmental engineering – theories of solid, water and air pollution effects and remedies; agricultural, mining, food processing and chemical manufacturing treatment of solid, water and air leachates; nuclear wastes; applications and practical problems;
 - H. Nano Technology/Robotics - use of basic chemistry principles and applications in the field of nano engineering and robotics, as applied to medicine, environment and abatement of solid, liquid and air pollutants.

GENERAL ENGINEERING

- A. Mathematics: Algebra, Trigonometry, Analytic Geometry, Differential Calculus, Integral Calculus, Differential Equation, Statistics & Probability Theory
- B. Engineering , PRC Laws and other relevant laws, rules and regulations: R.A. (9297, the chemical engineering law as revised and the applicable rules and regulations; the PRC Modernization law; the Code of Ethics for professionals; foreign investments laws; the BOI Investment Priorities Plan and the Foreign Investment Negative List; the DOLE Positive List for Foreign Nationals; the ASEAN Engineering MRA and corresponding rules and regulations; APEC; environmental laws, intellectual property, contracts
- C. Physics; mechanics, sound waves, heat, electricity, magnetism, light semi-conductors, optics, motion, vectors, force, power, work, energy, momentum and impulse
- D. Mechanics; statics, dynamics of free falling bodies, co planar systems, frames and trusses, moment of inertia, kinetics and kinematics of particles and rigid bodies, friction, centroids, center of gravity, mass, force, and acceleration,
- E. Strength of Materials; materials engineering, polymer, rigid and composite structures, stress and strain, thermal expansion and deflection in beams
- F. Engineering Economy; financial accounting, value of money, economic project evaluation, capital evaluation evaluation risks and uncertainties in outcomes, value engineering in plant design and operations

CHEMICAL ENGINEERING PRINCIPLES

- A. Chemical Engineering Calculations: Mass and energy balances (Stoichiometry); Principles of equilibrium applicable to unit operations and processes; material and energy balances applicable to industrial processes, e.g. gaseous, liquid and solid fuels, sulphur, nitrogen compounds, etc.
- B. Chemical Engineering Thermodynamics: First and second laws of thermodynamics; P-V-T relationships of fluids, heat effects, thermodynamics of flow processes, power and refrigeration cycles, phase equilibria, and chemical reaction equilibrium.
- C. Reaction Kinetics: Principles and applications of chemical kinetics to the design of chemical reactors.
- D. Unit operations: Principles of fluid and particle mechanics and transport phenomena; heat, mass and momentum transfer; separation process (filtration, membrane separation); stage-wise operations (extraction, evaporation, distillation); adsorption, fluidisation, size reduction.

- E. Chemical Process Industries: Unit processes and operations involved in the inorganic and organic chemical industries.
- F. Plant Design: Application of physical and chemical principles in the design of industrial plants or parts thereof involving preparation of process flow sheets, mass and energy balances, and equipment design.
- G. Instrumentation and Process Control: Principles and operations of a wide variety of process instruments and control system and the proper selection thereof for practical industrial application.

Exempt from registration are foreign chemical engineers who: are recognised as experts, called by government for consultation or for specific design or for project installation, provided practice is confined to such work for a limited period and as approved by the PRB/PRC. The foreign chemical engineers must also have distinguished themselves in their fields of specialisation, contracted as professors or lecturers in chemical engineering subjects by Philippine educational institutions.

Foreign chemical engineers may be granted some but not all rights or privileges in accordance with the existing chemical engineering and PRC laws if the foreign country of origin or registration grants the same or similar rights or privileges to Filipino chemical engineers.

- **CIVIL ENGINEERING**

To become a professional civil engineer in the Philippines, one as to be:

- At least 21 years of age;
- Citizen of the Philippines;
- Graduate of a course in Civil Engineering from a recognised institution; and
- Have passed professional examinations in the fields of mathematics and surveying, hydraulics, and design and construction.

Foreign engineers are allowed to sit for the examination if the home country of the foreign engineer admits citizens of the Philippines to practice the profession without restriction, or allows the Philippines' engineer to practice it after passing the examination on equal terms with foreign citizens including unconditional recognition of degrees issued by learning institutions recognised by the Philippine Government.

Exempted from registration are:

- Officers/ enlisted men of the US & Philippine Armed Forces & civilian employees of US government stationed in the Philippines, while rendering civil engineering services for the US and/or the Philippines.

Civil Engineers/experts called in by Philippine Government for consultation or specific design and construction of fixed structures provided such practice is limited to such work.

- **ELECTRICAL ENGINEERING**

To be a professional electrical engineer, one has to be:

- a citizen of the Philippines;
- of good reputation with high moral values;
- has not been finally convicted by the court of an offense involving moral turpitude;
- a holder of the degree of Bachelor of Science in Electric Engineering (BSEE) from a university, school, college, academy or institute duly constituted, recognised and accredited by the Philippine government; and

- He is a registered electrical engineer with valid certificate of registration and professional license and with four (4) years or more of active practice reckoned from the date of his registration as a registered electrical engineer.
- The applicant must also pass professional examinations which include the following subjects:
 - A. Mathematics
 - B. Engineering Sciences and Allied Subjects: General Chemistry; College Physics; Computer Fundamentals & Programming. Engineering Materials; Engineering Mechanics; Fluid Mechanics; Strength of Materials; Thermodynamics; Electrical Engineering Law; Engineering Economics; Engineering Management; Contracts & Specifications; Code of Professional Ethics; Philippine Electrical Code Parts 1 and 2
 - C. Electrical Engineering Professional Subjects: Electric Circuits; Electronic Theory & Circuits; Energy Conversion; Power Transmission and Distribution; Instrumentation & Measurement; Circuit and Line Protection; Control System; Principles of Communication; Electrical Machines; Electrical Equipment; Components & Devices; Electric Systems; Power Plant; Electronic Power Equipment; Illumination; Building Wiring

Exempt from examination or registration are foreign electrical engineers, erection, commissioning, guarantee engineers employed as technical consultants by Philippine government or private firms. However it need to be shown that no qualified Filipino is available as certified by APO or foreign electrical installer for erection or installation of special project or work.

It has to be shown that the foreign engineers are legally qualified to practice the profession in the foreign country in which requirements for obtaining license or certificate of registration are not lower than those specified in the electrical engineering law; that their scope of work is limited to particular work contracted; that they shall secure a special permit from PRC prior to commencing work; and they shall not engage in private practice.

It is also a requirement that for every foreign professional contracted, one registered Filipino understudy shall be employed by private firm utilising the services of such foreign professional during his tenure with the firm. The exemption from examination or registration is valid for 6 months which is renewable for another 6 months.

A foreign engineer may be admitted to take the Board examination or be given Certificate of Registration or be entitled to rights and privileges if his country specifically permits Filipino engineers to practice within its territorial limits on same basis as subjects/ citizens of such country.

To be a Registered electrical engineer, one has to be a citizen of the Philippines; of at least twenty-one (21) years of age; is of good reputation with high moral values; has not been finally convicted by the court of an offense involving moral turpitude; and is a holder of the degree of Bachelor of Science in Electrical Engineering (BSEE) from a university, school, college, academy or institute duly constituted, recognised and accredited by the Philippine government.

To be a Registered Master Electrician, one has to be is a citizen of the Philippines; is at least eighteen (18) years of age; is of good reputation with high moral values; and has not been finally convicted by the court of an offense involving moral turpitude. The Candidate must also have any of the following technical backgrounds:

- (1) Has completed at least three (3) years of a five-year Bachelor of Science in Electrical Engineering (BSEE) program or a three-year course in electrical engineering technology from an engineering school recognised by the Philippine government and, in addition, has a subsequent specific record of one (1) year practice in electrical wiring and installation, operation and maintenance of utilisation devices and equipment; or
- (2) Has graduated from a two-year electrician's course of instruction from a vocational or trade school recognised by the Philippine government and, in addition, has at least two (2) years of apprenticeship after completion of the course of instruction on electrical installation, operation and maintenance of utilisation devices and equipment; or
- (3) Has completed a one-year electrician's course of instruction from a vocational school recognised by the Philippine government and, in addition, has at least three (3) years of apprenticeship after completion of the course of instruction on electrical installation, operation and maintenance of utilisation devices and equipment; or
- (4) Has completed a four-year high school education or its equivalent and, in addition, has subsequent specific record of at least five (5) years of apprenticeship in electric wiring, installation, operation and maintenance of utilisation devices and equipment.

- **ELECTRONICS ENGINEERING**

In order to be allowed to take the examination for Electronics Engineer or Electronics Technician, an applicant must, at the time of the filing of his/her application, establish to the satisfaction of the Board that:

- (a) the applicant is a citizen of the Philippines or of a foreign country qualified to take the examination as provided for in Section 33 of this Act;
- (b) the applicant is of good moral character and had not been convicted by a court of law of a criminal offense involving moral turpitude;
- (c) that the applicant is a holder of a degree of Bachelor of Science in Electronics and Communications Engineering or Electronics Engineering, or subject to compliance with minimum requirements to be prescribed by the Board, such equivalent and/or related engineering course or program from any school, institute, college, or university recognised by the Government or the State where it is established, after completing a resident collegiate course equivalent to that of a full baccalaureate degree.

To be registered as a Professional Electronics Engineer, a person, either a citizen of the Philippines or of a foreign country under foreign reciprocity provisions must have:

- a. A valid Certificate of Registration / Professional ID Card as Electronics Engineer;
- b. A valid APO Membership / ID Card;
- c. At least 7 years of experience, the last 2 years shall be in responsible charge of significant engineering work; and three certifications signed by 3 Professional Electronics Engineers attesting veracity of experience record.
- d. BS Electronics & Communications Engineering or Electronics Engineering or equivalent engineering course from government- recognised school/ institute/ university.

The examination for electronic engineers shall consist of written tests which shall cover subjects prescribed by the Board but including at least the following: Mathematics, Applied Sciences, Engineering Economics, Laws and Ethics, Electronics, Communications, Computers, and Information and Communications Technology.

Exempted from examination or registration are Foreign Professional Electronics Engineers temporarily employed by Philippine government or private firms where:

- No qualified Filipino professional is available for specific works as attested by APO;
- Conditions of scope of project or funding stipulate temporary employment of foreign professional;
- Services are under GATS/ ASEAN/ APEC Engineer Registry programs or other international treaties or agreements.

It must also be shown that the foreign professional is legally qualified to practice in his own country in which licensing or registration requirements are not lower than those under the Electronics Engineering Law. It is a requirement that the work performed by foreign professional is limited to that specified in the contract. In such circumstances the foreign professional shall secure special permit from Board of Electronics Engineering prior to commencement of work, failing which there will not be any issuance of working permit or visa.

The law provides that the foreign professional shall not engage in private practice. The law also imposes a condition that for every Foreign professional contracted at least 2 corresponding registered Filipino professionals shall be employed as counterparts in the duration of work; and

Foreign professionals may be admitted for registration with or without examination if the home country of the foreign engineer admits Filipino citizens to practice the profession after an examination or registration process on terms of strict absolute equality with citizens or nationals of said country, including unconditional recognition of professional license and degrees or diploma.

- **MECHANICAL ENGINEERING**

To qualify as a Professional Mechanical Engineer, an applicant must be a citizen of the Philippines who meets the following requirements:

- a. A registered Mechanical Engineer or holder of a valid Certificate of Registration or professional license;
- b. Having completed approved course in mechanical engineering from recognised school or college;
- c. Having four (4) years or more active mechanical engineering practice from the time he became a registered mechanical engineer; and
- d. Competent to practice as attested by at least 2 professional mechanical engineers.

The person must have also passed the professional examinations, consisting of the following subjects:

- Mathematics, engineering economics and basic engineering economics
- Power and industrial plant engineering
- Industrial Plant Engineering
- Engineering Economics, ME Law & Code of Ethics
- Basic Engineering Sciences and Engineering Materials
- Machine Design, materials and shop practice

Temporary/ Special Permit from Board of Mechanical Engineering may be issued to:

- a. Foreign Mechanical Engineers, installation or commission or graduate engineers called in for consultation projects not requiring more than 3 months residence in the Philippines in a 12-month period, provided they are legally qualified in their countries in which requirements or qualifications are equal to those specified in Philippine Law on Mechanical Engineering.

- b. Foreigners employed as technical officers, training officers, consultants who are necessary or advantageous for the country particularly in aspects of technology transfer.

In such circumstances, it must be shown that there is no competent, able or willing Filipino mechanical engineer. The foreign engineers must also show that they are previously employed foreigners by engaging firm or foreign business partner for not less than one year immediately preceding date of engagement. Any specific engagement shall not be more than 6 months which may be renewed once, except for a newly established firm, such period of engagement may be longer but not to exceed two years.

A Certificate of Registration may also be issued to a foreign engineer if the home country of the foreign engineer permits Filipino citizens to practice within its territorial limits on same basis as the citizens of such country.

- **METALLURGICAL ENGINEERING**

An applicant to practice metallurgical engineering must have passed licensure examination and issuance of Certificate of Registration. Exempt from examination are holders of Doctorate Degree. In addition, the applicant must be:

- A citizen of the Philippines or foreigner whose country accords reciprocity with the Philippines;
- At least 21 years of age;
- A graduate from government recognised school, college, university or institute with BS Metallurgical Engineering or Metallurgy; BS Mining Engineering or Chemical Engineering with 5 years metallurgical engineering experience; or
- A BS in any engineering discipline with 10 years metallurgical engineering experience certified by applicant's employer, provided this privilege is also given by other engineering professions to graduates of metallurgy/ metallurgical engineering.

Foreigners may take licensure examination under reciprocity provisions. Exempt from registration are foreign consultants, engineers or technicians who are called in by the Government for consultation/ specific assignment project; or employed by private firm provided no qualified Filipino is available as certified by the firm and that employment is for one year extendable for another year and not to exceed three years for any one individual.

Exempt from examination are foreign metallurgists or metallurgical engineers who have been in actual, bona fide metallurgy or metallurgical engineering practice for at least 5 consecutive years in the Philippines.

Foreigners exempt from registration must show that they are of good reputation and moral character. The foreign applicants are required to submit their CV and exemption application to the Board of Metallurgical Engineering and not to engage in private practice. It is a requirement that for every applicant, one registered Filipino understudy shall be employed by the firm; and that the applicant is legally qualified to practise in his country which also allows Filipinos to practice the profession within its territorial limits.

Metallurgical engineering licensure examinations shall consist of:

- The conceptual knowledge and understanding of the scientific, engineering and economic terminologies, theories and principles underlying the preparation, separation, recovery and concentration of metals and mineral values from their ores and such other secondary sources as may be feasible, and, as well as the extraction and purification of the former into their primary usable forms.

- It shall, likewise, include adequate knowledge and appreciation of commercially available and generally applied unit metallurgical process and operations which are of immediate and significant relevance to the intelligent, economic, competent and practical applications of the above theories, principles, unit operations and processes to metallurgical problems and situations as most likely to be encountered in practice.
- Mineral Processing
- Ores and Other Sources of Metals and Minerals
- Principles and Theories Involved in the following: Liberation; Comminution; Separation and Concentration; Dewatering and Filtration; Other relevant miscellaneous processes and operations
- Sampling, Testing and Milling Calculations
- Plant Operations and Flow sheets including waste handling and treatment recovery and/ or disposal in mineral processing
- Applications
- Extractive Metallurgy
- Pyro metallurgy
- Hydrometallurgy
- Electrometallurgy General Concepts
- Ore Microscopy
- Fire Assaying
- Metallurgical Physical Chemistry
- Inorganic Qualitative and Quantitative Chemistry

METALLURGY II

- Physical Metallurgy
- Mechanical Metallurgy
- Crystallography/Metallography
- Iron and Steel Metallurgy
- Non-Ferrous Metallurgy
- Foundry

METALLURGY III

Conceptual knowledge, understanding and applications of the concepts terminology and principles of Basic Computer Science, Refractory Science, Fuel Technology. Metallurgical Law, Ethics, Statistics, Engineering Management, Mechanics and Hydraulics.

- **MINING ENGINEERING**

To qualify as a mining engineer, a person must be a citizen of the Philippines, at least 21 years of age and holds a BS Mining Engineering from duly recognised school, college, university; or a BS in any engineering course, geology with at least 5 years of practical mining engineering experience, provided other engineering professions give same privilege to mining engineering graduates. A foreigner may also register as a mining engineer if the home country of the applicant accords reciprocity with the Philippines;

Exempt from registration are mining engineering practitioners engaged by government for consultation, specific purpose or mining industry; and foreigners employed by private firms as technical consultants if no qualified Filipino is available. It is a requirement for the foreign engineer to submit a copy of the CV to the Board of Mining Engineering prior to arrival in the Philippines.

The foreign engineer is not allowed to engage in private practice and for every foreign applicant, one Filipino understudy registered shall be employed by private firm utilising foreigner's services during his tenure. Exemption is only valid for six months renewable for another six months. It is also provided that each private firm is allowed a maximum of 3 foreign consultants at any one time.

A foreigner may be admitted to take the exam if foreign country accords reciprocity with the Philippines; and foreign mining engineers may be granted rights or privileges if home country of the foreign engineer permits Philippine mining engineers to practise within its territorial limits on same basis as subjects/ citizens of such country.

Licensure examinations consist of the following subjects:

A. Mine Engineering I

1. Mineral prospecting and exploration – methods and techniques, tools, instruments, equipment, mapping and map interpretation, diamond drilling, core logging, drill hole data management and analyses, geophysical and geochemical analyses, and other related topics.
2. Mine planning, design and development – elements of mining, mine capacity optimisation, pit optimisation, underground and surface development, ore haulage and handling, mining equipment sizing and selection, cost estimations, applied mathematics in mine engineering and economics, mine supports, mine drainage, report writing, and related topics.
3. Mining methods - surface and underground mining methods, quarrying, nonconventional methods (e.g. in situ leaching and solution mining), drilling and blasting, small scale mining and related topics.
4. Mine ventilation, safety and health – ventilation methods, tools and equipment, mine hazards, safety practices, rules and regulations, accident prevention, first aid, mine rescue, safety tools and equipment, safety statistics, sanitation, noise and illumination and related topics.
5. Rock mechanics in mine engineering - Slope stability, slope failure analyses, core analyses, rock testing, foundation analyses, slope stabilisation, structural mapping, underground rock mechanics and related topics.

B. Mine Engineering II

1. Mine economics, valuation and feasibility studies mineral and engineering economics, basic economic principles, uses of metals and minerals, world markets, principles and quantitative analyses of time value of money, basic financial statements, cost parameters, investments related valuation criteria and principles, mine capacity optimisation and related topics. Sampling principles, techniques and tools, ore reserve estimation principles and methods, conventional or geostatistical methods of ore body modelling and ore reserve estimation, production optimisation, cost estimates and projections, metal prices, cut-off grades and related topics.
2. Computer applications - Basic electronic data processing, computerised ore reserve estimation, mine planning and production scheduling and other computer applications in mining.
3. Mine and mineral land surveying - Principles and calculations in geodetic and mine surveying, principles and applications of geographical positioning systems (GPS).

• **NAVAL ARCHITECTURE AND MARINE ENGINEERING**

To qualify as a naval architect and marine engineer, an applicant must be a citizen of the Philippines of at least 21 years of age and holds a BS Naval Architecture & Marine Engineering from Philippine, foreign government recognised school, college, institute or university.

Exempt from registration are officers, enlisted men, civilian employees of foreign governments stationed in the Philippines while rendering naval architecture and marine engineering services to their respective governments; and foreign naval architects and marine engineers called in for construction or for specific design, construction or projects where practice is limited to such work.

A foreign Naval Architect & Marine Engineer may be allowed to take the examination if his country admits Filipino citizens to practice the profession without restriction or allows them to practice after an examination on terms of strict, absolute equality with citizens of the said country, including unconditional recognition of degrees.

Applicants for certificate of registration as naval architecture and marine engineer shall be examined on the following subjects: Mathematics, theoretical and applied mechanics, naval architecture, marine engineering and such other pertinent subjects as the Board may deem necessary.

- **SANITARY ENGINEERING**

Any person applying for admission to the sanitary engineering examination as herein provided, shall, prior to the date of the examination, establish to the satisfaction of the Board that he has the following qualifications:

- (a) Be at least twenty-one years of age;
- (b) Be a citizen of the Philippines;
- (c) Be of good reputation and moral character; and,
- (d) Be a graduate of a four-year course in sanitary engineering or BSCE having taken major subjects in sanitary engineering from a school, institute, college or university recognised by the Government or the State wherein it is established.

To become a professional sanitary engineer in the Philippines, the applicant must have passed professional examinations as provided in the table of specifications of examination for Civil Engineering; Environmental Engineering; Public Health Engineering; Sanitary Science as Applied to Buildings; Waste Water Engineering and Water Supply Engineering.

Exempted from registration are officers or enlisted men of the United States and Philippine Armed Forces and civilian employees of the Government of the United States stationed in the Philippines while rendering sanitary engineering services for the United States and/or Philippines. Also exempted from registration are foreign sanitary engineers or experts called in by the Philippine Government for consultation for specific sanitary engineering services. It is a requirement that the practice shall be limited to such work and that they do not engage in private practice at their own account as sanitary engineers.

3.8.4. Setting-up an Engineering Practice

The form of engineering practice in the Philippines depends on the engineering discipline that a person practices in. Some of the engineering disciplines allow the formation of partnerships, associations or corporations (organised by licensed professionals) for professional practice. Other sectors specify corporations' liability as an entity. However, in general, the responsibility of practice still lies on the individual professional in terms of liability and any violation of the law. None of the laws have specific provisions on minimum capital or number of partners. However, all members should be registered or licensed professionals in the Philippines.

The type of entity allowed for each engineering discipline is shown in Table 1 below:

Discipline	Type of entity allowed
Agricultural Engineering	<p>Corporate practice is not allowed. However agriculture engineers may practice through a firm, partnership or association and obtain SEC registration.</p> <p>All members / partners / associates shall be registered / licensed agricultural engineers.</p>
Chemical Engineering	<p>Corporate practice is not allowed.</p> <p>Duly licensed / registered chemical engineers may form partnerships among themselves or with other licensed / registered engineers and architects.</p>
Civil Engineering	<p>Corporate practice is not allowed.</p> <p>Registered/ licensed civil engineers may, among themselves, or with registered/ licensed architects, form and obtain registration of a firm/ partnership/ association, provided members who are civil engineers and architects of firm/ partnership/association shall render work/services proper for civil engineers or architects, respectively, shall be responsible for their own respective acts.</p>
Electrical Engineering	<p>Corporate practice is not allowed</p> <p>Licensed professional electrical engineers may, among themselves, form a partnership/ association and collectively render electrical engineering service; and Individual members of such partnership / associations shall be responsible for their own respective acts.</p>
Electronics Engineering	<p>Corporate practice is not allowed.</p> <p>Registered / Licensed Professional Electronics Engineers / Electronics Engineers / Electronics Technicians may, among themselves or with other allied professionals, form a partnership / association / corporation and collectively render services, provided individual members of such partnership / association / corporation are responsible for their own respective acts.</p>
Mechanical Engineering	<p>Corporate practice is not allowed.</p> <p>Registered/ licensed mechanical engineers may form/ obtain SEC registration of a firm/ partnership/ association.</p> <p>Only duly registered / licensed Mechanical Engineers, who are members / partners / associates shall render services proper for mechanical engineers as defined by law.</p>

Metallurgical Engineering	A firm/ co-partnership/ company/ corporation / association can practice metallurgical engineering in the Philippines, provided such practice is carried out by metallurgical engineers holding valid certificates of registration issued by the Board of Metallurgical Engineering and in the regular employ of said firm/ co-partnership/ company/ corporation or association.
Mining Engineering	Corporate practice is not allowed
Naval Architecture and Marine Engineering	A firm / partnership / corporation / association may engage in practice of naval architecture & marine engineering, provided such practice is carried out under the supervision of registered naval architect & marine engineers.
Sanitary Engineering	A firm/ partnership/ corporation/ association may engage in the practice of sanitary engineering, provided such practice is carried out under supervision of a sanitary engineer/s holding valid certificates issued by Board of Sanitary Engineering.

Table 1: Types of Professional Services Entity in the Philippines

While the Philippine Constitution provides that: *“the practice of all professions in the Philippines shall be limited to Filipino citizens, save in cases prescribed by law”*, most laws provide certain provisions which specify how foreign professionals may practise their professions in the Philippines. In addition, one of PRC’s functions is to supervise foreign practice in the Philippines.

Professional practice of foreigners is subject to the PRC law, *Section 7(j) of RA No. 8981*, and specific provisions of respective professions. If there is no provision, the respective laws and the Constitutional mandate on professional practice, provides that, *“The practice of all professions in the Philippines shall be limited to Filipino citizens, save in cases prescribed by law.”*

In addition, a Registered Foreign Professional Engineer must obtain a Special or Temporary Permit from PRC pursuant to Section 7 paragraph (j) of Republic Act No. 8981 before the RFPE can practise his profession in the Philippines.

3.9. Singapore

3.9.1. Laws and Regulations

The main domestic regulations governing the engineering profession in Singapore are:

1. Professional Engineers Act 1991;
2. Professional Engineers Rules 1991;
3. Professional Engineers Board Rules 1991; and
4. Professional Engineers (Approved Qualifications) Notification 2009.

Professional Engineers Board (PEB), Singapore is the governing body of the professional engineering profession in Singapore. The PEB registers professional engineers in the branches of civil, electrical and mechanical engineering.

The Professional Engineers Board is a statutory body which administers the Professional Engineers Act 1991 (PE Act), which is an Act of Parliament that provides for the registration of professional engineers (PEs), regulates the qualifications and conduct of professional engineers and regulates corporations which supply professional engineering services in Singapore. PEB's mission is to safeguard life, property and welfare of the public by setting high standards for registering and regulating PE. The main objective of the registration of PEs is to ensure that engineering works that involve public safety and interest are carried out by persons who are competent.

3.9.2. Professional Association

Institution of Engineers Singapore (IES) is the premier national society of engineers in Singapore.

3.9.3 Qualifying as a Professional Engineer

PEB registers professional engineers in the branches of civil, electrical and mechanical engineering. A person may apply for registration as a professional engineer (PE) with Professional Engineers Board (PEB) Singapore if he meets the following requirements:

- a. Obtained approved educational qualifications;
- b. Acquired at least 4 years of practical experience, of which at least 2 years should be whilst under the supervision of a registered PE who has in force a practising certificate (PC);
- c. Sat and passed 2 examinations conducted by PEB, the Fundamentals of Engineering Examination (FEE) and Practice of Professional Engineering Examination (PPE); and
- d. Attended and passed the professional interview.

- **Approved Educational Qualifications**

A person applying for registration as a professional engineer to the PEB is required to hold an approved qualification listed in the Professional Engineers (Approved Qualifications) Notification 2009. The approved qualifications include degrees from local institutions such as the Nanyang Technological University and the National University of Singapore as well as various other overseas degrees as specified in the Notification.

- **Sit and Pass Examinations Conducted by PEB**

An applicant is required to sit and pass the Fundamentals of Engineering Examination and the Practice of Professional Engineering Examination.

- **Fundamentals of Engineering Examination**

The Fundamentals of Engineering Examination (FEE) tests an applicant's knowledge of fundamental engineering subjects in civil, electrical or mechanical engineering. A person may apply to sit for the Fundamentals of Engineering Examination after he has obtained an approved degree or qualification.

The examination is 'open book' and further details are available at the PEB website. FEE Part 1 consists of Core engineering subjects in civil/mechanical/electrical engineering, with 40 Multiple Choice Questions (MCQ). FEE Part 2 consists of Core/Elective subjects

in civil/electrical/mechanical engineering, where candidates are required to answer 5 out of 9 questions (civil); and 5 out of 7 questions (electrical, mechanical).

- **Practice of Professional Engineering Examination**

The Practice of Professional Engineering Examination (PPE) tests the applicant's ability to apply his knowledge and experience in professional engineering practice, and his knowledge of the rules and regulations regulating the practice of professional engineering in civil, electrical or mechanical engineering.

A person may apply to sit for the Practice of Professional Engineering Examination after he has:

- completed 3 years of practical experience in engineering work relevant to the branch of engineering that he seeks to be registered in; and
- sat for and passed the Fundamentals of Engineering Examination.

The examination is 'open book' and further details are available at the PEB website. PPE Part 1 which is Common Paper contains 10 compulsory Multiple Choice Questions and candidates are required to answer 3 out of 5 essay questions. PPE Part 2 consists of subjects in Civil/mechanical/electrical engineering where candidates will answer 1 compulsory question plus 4 out of 7 questions.

- **Professional Interview**

An applicant is required to attend a professional interview. The purpose of the professional interview is to determine the following:

- a. The duration and adequacy of practical experience;
- b. The type, quality and relevance of practical engineering experience;
- c. The character and reputation; and
- d. The ability to carry out the duties of a professional engineer effectively.

The professional interview process comprises three components: review of the Summary of Post-Graduate Professional Experience, assessment of the Report on Post Graduate Engineering Experience and attending the interview.

- **Summary of Post-Graduate Professional Experience**

The applicant is required to submit a chronological summary of his work history including a description of previous employment positions held and degree of responsibility in each position, nature and cost of projects involved, the professional engineers who had supervised the applicant, etc.

In terms of the duration of practical experience, a minimum of four years of relevant practical experience has to be acquired and these shall include the following types of practical experience:

- (a) where the person seeks to be registered in the civil engineering branch, the practical experience shall be obtained in Singapore —
 - (i) during a period of not less than 12 months (in aggregate) in a design office whilst under the supervision of any registered professional engineer who has in force a practising certificate; and
 - (ii) during a period of not less than 12 months (in aggregate) in supervisory work at a project site or engineering investigation work whilst under the supervision of any registered professional engineer who has in force a practising certificate;
- (b) where the person seeks to be registered in the electrical or mechanical engineering branch, the practical experience shall be practical experience in electrical or mechanical engineering work, as the case may be, obtained in Singapore during

- a period of not less than 2 years (in aggregate) whilst under the supervision of any registered professional engineer who has in force a practising certificate; or
- (c) where the person seeking registration in any branch of engineering is engaged in full-time teaching or research work, the practical experience shall be such experience as may be acceptable to the Board obtained during a period of not less than 2 years whilst under the supervision of any registered professional engineer who has in force a practising certificate.

- **Report on Post Graduate Engineering Experience**

The applicant is required to submit a 2,000-4,000 words Report on Post Graduate Engineering Experience. In the Report on Post Graduate Engineering Experience, the applicant is required to describe in detail his involvement in not more than four projects that he regards as the highlights of his professional experience in the branch of engineering that he is seeking registration.

For each project, the applicant shall describe his involvement in the technical, managerial, contractual, regulatory and other areas that he was involved in. He shall describe his personal contribution and responsibilities, the problems faced, the solution(s) found, the engineering and other judgments made and the impact the solution(s) and judgments generated.

- **Professional Interview**

An interview panel would be appointed to assess an applicant's submissions, following which the applicant will be invited to a professional interview. The professional interview is a review of the competencies that the applicant has claimed in his report. At the interview, the applicant would be invited to make a presentation on one or more of his projects highlighted in his report. The applicant would be expected to discuss with the panel on his involvement in achieving the various competency elements as presented in his report. The applicant is also expected to answer questions on other aspects relating to his application and professional practice.

3.9.4. Setting-up an Engineering Practice

PEB may issue a licence to supply professional engineering services in Singapore to any one of the following businesses:

- a. limited corporations;
- b. unlimited corporations;
- c. multidiscipline partnerships; and
- d. limited liability partnership.

A licensed limited corporation shall have the following:

- a memorandum of association which provides that a primary object of the corporation is to supply professional engineering services;
- a paid-up capital of S\$500,000; an articles of association which provides that a majority of directors shall be registered professional engineers or allied professionals;
- a director who is a registered professional engineer with a valid practicing certificate who assumes responsibility for the control and management of professional engineering work in Singapore; and
- insurance against professional liability.

A licensed unlimited corporation shall have the following:

- a memorandum of association which provides that a primary object of the corporation is to supply professional engineering services;

- an articles of association which provides that a majority of directors shall be registered professional engineers or allied professionals and that only a director, manager or employee of the corporation shall be a member of the corporation; and
- a director who is a registered professional engineer with a valid practicing certificate who assumes responsibility for the control and management of professional engineering work in Singapore.

A licensed multidiscipline partnership shall consist of only registered professional engineers and allied professionals with valid practising certificates and who each have a beneficial interest in the capital assets and profits of the partnership. Professional engineering work in Singapore shall be under the control and management of a partner who is a registered professional engineer with a valid practicing certificate.

A licensed Limited Liability Partnership (LLP) shall have the following:

- a statement lodged under the LLP Act which provides that a primary nature of the business of the LLP is to supply professional engineering services;
- at least one of the partners of the LLP is to be a registered professional engineer who has in force a practicing certificate and the other partners are either registered professional engineers or allied professionals who each has in force practicing certificate or corporations and LLP licensed under the PE Act, Architects Act or Land Surveyors Act where applicable;
- a partner who is a registered professional engineer with a valid practising certificate who assumes responsibility for the control and management of professional engineering work in Singapore; and insurance against professional liability.

Every licensed limited corporation or LLP is required to be insured against liability for any breach of professional duty arising out of the conduct of its business of supplying professional engineering services.

3.10. Thailand

3.10.1. Laws Governing Professional Engineering

Professional engineering services in Thailand are regulated and controlled by law under the Engineers Act, B.E. 2542 (1999) (the “Engineers Act”). The Engineers Act provides for the registration of professional engineers, regulates the qualifications and conducts of professional engineers and regulates corporations which supply professional engineering services in Thailand.

Under the Engineers Act BE 2542, “engineering profession” is defined as *the engineering profession in the field of civil engineering, mining engineering, mechanical engineering, electrical engineering, industrial engineering and other fields of engineering provided in ministerial regulations.*

Professional engineers in Thailand are governed by the Council of Engineers (COE), which registers professional engineers and set the standards for professional engineers in Thailand. The Board of the Council of Engineers consisting of 10 Council Board Members elected by ordinary members who do not hold the office of faculty in an educational institution at a degree level, 5 Council Board Members elected by ordinary members who hold the office of faculty in an educational institution at a degree level and 5 Council Board Members appointed by the Council of Ministers from ordinary members upon the proposal of the Minister.

3.10.2. Professional Associations

There are more than 10 professional engineering associations in Thailand including Engineering Institute of Thailand and Consulting Engineers Association of Thailand. Memberships with engineering professional associations are not compulsory as long as the professional engineer is registered with the COE.

3.10.3. Core Competency

The practice of engineering in Thailand is regulated by various legislative procedures at the national and provincial levels. The legislative body admits members to the profession and governs their practices. In addition to the academic requirements for licenser there are requirements for a supervised period of engineering experience, the ability to communicate effectively in the language of business of the jurisdiction, successful completion of a professional practice examination and validation of experience and ability through structured training programmes.

All registered engineers must be of at least 18 years old and must be registered with the COE as an ordinary member or extraordinary member. Ordinary members must be citizens of Thailand.

There are three levels of regulated engineering profession in Thailand. They are Associate Engineer; Professional Engineer; and Senior Engineer.

To become an Associate Engineer, a person must have a Bachelor Engineering degree accredited by COE. An Associate Engineer's practice will be limited to the area of practice and the size of work as specified in the relevant permit.

To become a Professional Engineer, a person must be an Associate Engineer with at least 3 years' experience after having become an Associate Engineer and have attended continuing professional development. The experience must be certified by a Professional Engineer or Senior Professional Engineer. Professional Engineer may practice engineering without limitation, but may not provide advice in engineering.

To become a Senior Professional Engineer, a person must be a Professional Engineer with at least 5 years' experience as a Professional Engineer with sufficient experience and continuing professional development. The experience must be certified by another Senior Professional Engineer. A Senior Professional Engineer may practice and provide advice in engineering without limitation.

A Foreign Engineer may apply to become an Adjunct Engineer, who will be subject to residency requirement of a six months visa for a stay in the Kingdom. However, the Adjunct Engineer must pass all tests which are conducted in Thai language.

Individuals who have not completed an accredited engineering program can meet the academic requirement through an examination program. Upon application to the COE, an individual's academic qualifications will be assessed and will be required to sit for a specific examination program assigned by the Committee of Engineering Qualification. Upon successful completion of the examination, covering the Basic Engineering for all disciplines and the Specific Engineering for each engineering disciplines, the candidate is deemed to have satisfied the academic qualification requirement.

All applicants are required to have a minimum of three years of acceptable engineering experience prior to registration.

Acceptable engineering experience must include the application of theory and experience in broad areas of practical experience, management, communication and the social implications of engineering. The engineering experience must relate to the jurisdiction process the Code of Ethics, the Code of Conducts, and the Code of Practices.

The engineering experience must be obtained in Thailand or in a Thai environment for at least two years. There must be at least one reference from a practising professional engineer or a senior engineer who is familiar with details of the candidate's work for the experience claimed. The immediate or direct supervisor of the candidate's present and past employers are the most suitable referees.

For larger projects or multiple engineering works, referees should provide information regarding the candidate's technical competence in the application of engineering principles and theory, ability to communicate, ability to work on a team, ability to exercise professional judgment, and whether the candidate is of good character and reputed as demonstrated through personal attributes such as integrity and responsibility.

All candidates for registration are required to successfully complete an examination to confirm that they have sufficient knowledge of the ethical considerations and obligations that accompany the privileges of professional status, as well as the legal concepts relevant to being professional engineers.

The Committee of Professional Practice Qualification conducts the assessment mechanism for independent practice. A supplementary report and interview are in co-operated in the assessment process.

For an engineering experience to be considered satisfactory, the record must show that it meets the basic requirements for Profession Practical Experience and conforms to the Code of Conduct. The experience is to be recorded in a report or a logbook and certified by the direct supervisor or a senior registered engineer.

To qualify for a professional surveying practice, the applicants will have to go through certain procedure set by the COE regulations:

- a. The COE will appoint a sub-committee to review engineering practical experiences including the amount of work, description of engineering practice and the performance. They have to satisfy the required conduct, structured training and some additional conditions as specified by each discipline.
- b. The applicants who have demonstrated that their professional practical experience has satisfied the basic requirements are partially approved by the sub-committee to take the written examination which will be specified to the applicants. The passing grade for the examination is 60% for each subject.
- c. The written examination for engineering practical experience concerns current engineering technology and practical matters, covering two categories. The first category, which is compulsory, covers core subjects, mainly basic requirement for the discipline and specific engineering for the sub-discipline. The second category cover elective subjects for individual sub – discipline.

The applicants who pass the written examination are required to sit for oral examination, which is conducted through an interview. During oral examination, candidates may be asked questions relating to the practical experiences and professional development. Candidates may be examined on:

- Responsibility in the engineering work;
- Skill in engineering discipline in relation to the Code of Conducts and the Code of Practices;
- Practical experiences in solving problems in engineering work, management skill, communication skill and jurisdiction process;
- Professional development from practical experience focusing on the scheme of technology transfer for young engineer and the society; and
- Public safety and the code of ethics.

3.10.4 Core Competency in Setting-up an Engineering Practice

The relevant engineering law in Thailand does not impose any restriction on the form of establishment for engineering practice, whether as a partnership, or a company. However, the form of establishment must be recognised under Thai law, therefore, the most common forms of establishment are partnerships and companies. Other requirements include to have a principal office in the Kingdom of Thailand; and at least half of the partners (in case of a partnership) or directors (in case of a company); or having the managing partner (in case of a partnership) or the managing director (in case of a company) or the only management of that juristic person (in case of other form of juristic person) with licence for controlled engineering profession.

Companies that wish to set up engineering practice must have its CEO a registered COE engineer or half of its directors or executive committee are COE registered engineers.

Foreign engineers must show registration information with the home country; education background; and CV that details professional practice and sizes of project involved.

Commercial presence for foreign engineers is permitted either in the form of a limited liability company, limited partnership or registered ordinary partnership whose head office is registered in Thailand and which meets the following conditions:

- a. For a Limited Liability Company, at least half of its director (s), or its managing director must be a person of Thai Nationality and obtain a license from Council of Engineers;
- b. For a Limited Partnership or Registered Ordinary Partnership; the managing partner or manager must be the person of Thai nationality; and
- c. at least half of its partner (s) must be the person of Thai nationality and hold a license from the COE.

Application by an ACPE from another participating ASEAN Country to work as a RFPE in Thailand must be submitted to the COE. Upon acceptance and payment of a prescribed fee, the RFPE will be permitted by the COE to work in collaboration with designated local licensed Professional Engineers.

The RFPE will not be eligible to work in independent practice where there is a need to certify engineering works as required by Thai laws and regulations. This includes for the purposes of submission to regulatory authorities unless the person is registered as a professional engineer in accordance with the Thai Engineer Act B.E. 2542.

Foreign engineers providing engineering services in Thailand are also required to observe other laws such as the law on foreign currency control, immigration law and Foreign Business Act, B.E. 2542 (1999).

3.11. Viet Nam

3.11.1. Laws and Regulations

Viet Nam does not have any specific law for the engineering profession. The Government, through the Ministry of Constructions (MoC), only regulates engineers in the constructions industry. The Construction Law (No. 50/2014/QH13 of June 18, 2014) regulates the rights and responsibilities of organisations and individuals involved in building construction and practice in the field of building and construction. A professional engineer in Viet Nam is an engineer that is granted a practicing certificate by a relevant authority under the Construction Law to allow him to practice as a project manager and/or a chief of engineers in the geotechnical investigation/design of engineering works.

3.11.2. Qualifying as a Professional Engineer

The Construction Law also provides for the registration of professional engineers engaged in construction-related branches of engineering, regulates the qualifications and conducts of those engineers and regulates organisations which supply construction related professional engineering services in Viet Nam.

Under the Construction law, construction practising capability of individuals is graded on the basis of their professional qualifications certified by a lawful specialised training organisation, experience and professional ethics. Individuals engaged in construction engineering and planning, construction survey, work designing and/or supervision of work construction, when independently conducting such activities, must have appropriate practice certificates and bear personal responsibility for their work.

The construction operation of organisations graded on the basis of construction practising capability of individuals in such organisations, experience in construction activities, financial status, equipment and managerial capacity of such organisations.

The two abovementioned requirement also applies to foreign organisations and foreign individuals engaged in construction activities in the territory of the Socialist Republic of Viet Nam.

For engineers in the branch regulated by the Construction Law, they are required to have minimum of 5 years working experience as a civil, mechanical, electrical or geotechnical engineer in constructions. An engineer is then required to possess a professional certificate from provincial construction departments.

An applicant for registration as a practitioner in a branch of engineering that is not regulated in the Construction Law is required to possess a Degree of Bachelor of Engineering and should have acquired not less than 4 years of relevant practical experience in the branch of engineering and at such level of responsibility as to be sufficiently competent for registration.

Where the applicant is engaged in full-time teaching or research work, relevant practice experiences not less than 6 years in the branch of engineering may be acceptable to the MoC.

A comprehensive report of professional engineering training and experience shall be submitted as proof of applicant's practice experiences. The report shall include details of the duration and a description of the practice experience. The report, which is about 2,000

words, should fully describe the professional engineering training and experience since graduation. The report must not be a mere inventory of work prepared and executed but must describe the tasks on which an applicant has been employed, whether in investigation, planning, design, construction, manufacture or research.

The report shall also include detailed accounts of projects and their cost/value carried out in chronological sequence and the applicant's degree of responsibility and precise position occupied. The applicant shall explain his specialisation, exceptional experience and special problems encountered during the practice.

The monitoring committee may conduct a professional interview with the applicant. The monitoring committee will appoint an Assessment Panel for the purpose of ascertaining the attributes gained in practical experience in engineering. The interview will be based on the applicant's Report of Experience and the documents submitted.

The main purpose of the professional interview is to assess:

- a. The nature and duration of this practical engineering experience;
- b. The applicant's ability to plan, design and supervise the construction / operation of engineering work which shall ensure safety of life and safeguarding of public health or property;
- c. The applicant's ability to carry out the professional duties effectively; and
- d. Ability to express his/her ideas.

The applicant may also be required by the Assessment Panel to:

- a. Submit drawings, calculations, and/or other documents duly certified by his superior or employer;
- b. Part of a feasibility study or a technical report for an engineering project, or a functional and economic comparison of design for an engineering system;
- c. A report incorporating research details an application of his research work in practice, where applicable. The report may be illustrated by drawing and must describe work actually carried out by the applicant; or
- d. Write an essay on a subject or subject selected by the Assessment Panel if it is considered necessary by the Panel.

The applicant should also satisfy the monitoring committee as to his character and reputation, and should submit certificate of good conduct from 2 referees.

3.11.3 Setting-up an Engineering Practice

To be eligible for independent engineering practice, an engineer must be registered as a professional engineer under the Construction Law and in possession of a valid practising certificate issued by a relevant authority.

Foreign companies and engineers are allowed to practice in Viet Nam. Foreign consulting engineers have no limitations to practice in Viet Nam. Foreign engineering services suppliers can bring into Viet Nam only management and technical personnel that are not available in the country. Unless otherwise specified, foreign enterprises are allowed to establish commercial presence in Viet Nam in the form of business co-operation contract.

Foreigners wishing to work in Viet Nam must be at least 18 years old and be of good health to satisfy the job requirements. Only those with high technical skills or high professional qualifications in the relevant field and with considerable experience may be employed.

A foreign worker with a valid work permit may also apply for a Temporary Residence Card for a period of up to three years. The application must be submitted to the provincial Immigration Department, and may include supporting documents such as a housing lease contract and an employer's certificate of incorporation.

A work permit is normally required for a foreign employee working for more than three months in Viet Nam. A work permit is issued by the Department of Labour, War Invalids, and Social Affairs (DOLISA).

A work permit is not required for the following foreign employees:

1. A member or owner of a limited liability company or a member of the board of management of a shareholding company;
2. A Chief Representative Officer, Chief Project Officer, or representative of a foreign nongovernmental organisation for its operation in Viet Nam.
3. An internal transferee of a company that engages in one of 11 service sectors as stated in Viet Nam's WTO service commitments; and
4. A person providing professional and technical consultancy service or conducting other missions serving for the implementation, evaluation, and supervision of Official Development Aid programs or projects according to the agreements signed between foreign parties and the Vietnamese Government.

04.

**ANALYSIS OF
THE QUALIFYING
AND PRACTICE
REQUIREMENTS**

4.1. Introduction

As discussed in Chapter, each AMS imposes different requirements and conditions for the engineering professionals to qualify as professional engineers; to set-up engineering practice; and to employ foreign engineers. Each AMS has different tertiary education system for those aspiring to become engineering professionals. The Chapter will provide detail discussion on the differences and gaps, including any gender bias, in the qualifying system for the engineering profession in ASEAN.

4.2. Education and Professional Qualification

In preparing the handbook, the authors conducted field visits and discussions with relevant regulatory authorities and professional associations (where relevant and available) in each AMS. The authors find that each AMS has different forms of tertiary education and professional qualification systems for the engineering profession.

Although all AMS offer engineering education at the tertiary level some countries like Brunei do not offer certain types of engineering education due to the lack of demand from potential students. Thus, students may have to pursue their engineering education elsewhere.

All AMS engineering education at the tertiary level is geared towards meeting the basic requirement for qualifying as a professional engineer. In order to enhance the standards of professionalism of engineers, newer AMS, Lao PDR, Cambodia and Viet Nam are moving towards having professional regulators to offer professional qualifications to potential professional engineers.

In most AMS, professional regulatory authorities such as the Council of Engineers or the Board of Engineers monitor the curriculum and studies at the tertiary level to ensure that the education offered are in compliance with the minimum standards imposed by the regulators. Several AMS such as Indonesia, Malaysia, Myanmar, the Philippines, Singapore and Thailand maintain highly sophisticated accredited engineering systems to ensure that the degrees issued by the relevant universities, at home and abroad, meet the core competency requirement of the professional regulatory authorities.

Malaysia and Singapore as members of the Washington Accord ensure that only graduates of accredited programs are able to practice as professional engineers. At the same time Lao PDR is working towards improving the professional education system in order to enhance the quality of engineering graduates from local universities.

The summary of the core findings is shown in Table 2 below:

Brunei Darussalam	Brunei Darussalam universities offer tertiary education in selected engineering discipline. For other disciplines, students will have to pursue their studies abroad. To be able to register as a professional engineer, an applicant must possess a university qualification recognised by the Board of Architect, Professional Engineers and Quantity Surveyors.
Cambodia	The Board of Engineers ensures that university degrees meet the requirement in order to allow a graduate to become a professional engineer.

Indonesia	Engineering degrees require accreditation by the relevant accreditation bodies in order to meet the professional requirement imposed by LPJK and BNSP. There are many professional associations who further impose additional membership requirement and offer continuous professional development programs.
Lao PDR	Lao National University offers engineering degrees to meet the national engineering requirement. However the lack of professional regulatory authority and professional association could have an impact on the quality of engineering graduates from Lao PDR.
Malaysia	Malaysia's engineering degrees are accredited by the Board of Engineers and in compliance with the requirement set by the Washington Accord. The professional association also offers continuous professional development programs.
Myanmar	Myanmar Council of Engineers monitors university education in Myanmar to ensure that the qualifications meet the minimum standard for professional membership.
The Philippines	Universities in the Philippines offer degree programs that comply with the PRC requirement and the degree must contain basic education and subject requirements where students must study for a minimum of 5 years. The professional associations organised under the PRC also offer continuous professional development programs.
Singapore	Singapore's engineering programs are accredited by the Engineering Accreditation Board of the Institution of Engineers Singapore. Degrees offered by Singapore's universities from accredited programs in civil, mechanical and electrical engineering are recognised for registration as professional engineers with Professional Engineers Board Singapore. The Institution of Engineers Singapore also offers continuous professional development programs.
Thailand	Thai universities offer degree level education that offer core competencies required by the professional regulatory, the COE. Professional associations organise continuous professional development programs.
Viet Nam	Universities in Viet Nam do offer courses that meet the Construction Law requirement.

Table 2: Implementation of Engineering Core Competencies in ASEAN

4.3. Gaps and Shortfalls in Qualification Systems

This section examines gaps and shortfalls in the professional administration and qualification systems in the engineering profession in AMS. Discussions will focus on the gaps and shortfalls in the regulatory authorities, graduate requirement, entrance examinations and the minimum professional experience.

1. Authorities

Most AMS provide for a professional regulatory authority in the form of a specialised Board or Council that governs all engineering disciplines. However, the organisation and structure of each authority differs from one country to another.

Philippines and Indonesia have more than one authority governing the engineering profession. In the Philippines, the PRC provides for individual Board for 12 different engineering disciplines. In Indonesia, the regulatory authority for the construction related engineering disciplines is the LPJK whereas the non-construction related disciplines are governed by the BNSP. Brunei on the other hand has a fused authority that governs architecture, engineering and quantity surveying.

In several AMS, regulatory authorities only regulate certain types of engineering practice. In Lao PDR, ALACE only covers civil engineering, whilst Thailand's Council of Engineers only covers civil engineering, mining engineering, mechanical engineering, electrical engineering, industrial engineering, environmental engineering and chemical engineering. Surveyors are also included in the civil engineering practice in Thailand. In Viet Nam, although the Ministry of Construction is the main authority, it only covers construction related engineering. Viet Nam does not have any regulations governing non-construction related engineering.

2. Minimum Experience Requirements

The minimum number of experience also differs from one place to another. For example, the Brunei Board of Architects, Professional Engineer and Quantity Surveyor require a 2 year experience, 1 of which is in Brunei; whereas Cambodia imposes 5 year experience to those with basic degree, 3 years for those with a Master degree and 2 year with a graduate degree and Viet Nam imposes a blanket 5 year experience requirement.

Malaysia requires 3 years of experience and Singapore requires 4 year experience and both may impose experience requirement in the sub-disciplines. Indonesia and Thailand on the other hand requires different levels of experience requirements for different levels of engineers. Myanmar requires a 2 year general training and 5 years of professional development.

3. Professional Entrance Examinations

The authors also find that each AMS has different modes of professional entrance examinations. At the moment, Brunei and Lao PDR do not impose any professional entrance examination. In Brunei, the Brunei Board of Architects, Professional Engineer and Quantity Surveyor may impose examinations once the new law comes into force. Malaysia and Singapore imposes Part 1, Part II and Professional Examinations which may include written and oral examinations. Cambodia, Indonesia, Myanmar, Thailand and the Philippines also provide a very elaborate professional examination requirement.

4.4. Equal Opportunities

The result of field works finds that no ASEAN Member States' professional education and qualification system systematically discriminates against any gender or any race or ethnic group.

Membership of the professional organisations is open to all races and genders and no AMS have any measures that discriminate any gender or race from entering the profession. Generally, the study finds that, in most AMS, women entering universities or colleges and taking up courses which can lead to the relevant professional qualifications are higher than the actual number entering the profession upon graduation.

The composition of the engineering sector is shown in the Table below:

Brunei Darussalam	According to the Board, as of 2013, there were 18 registered mechanical and electrical engineers, out of which, 1 is female. There were 33 registered civil and structural engineer, 32 are male and 1 is female. Out of 135 PUJA members about 12% are women.
Cambodia	824-No data on female registered engineers
Indonesia	10% are women
Lao PDR	No data
Malaysia	No data
Myanmar	No data
The Philippines	8000 members, and a small percentage are women
Singapore	3500 registered professional engineers, about 5 % women
Thailand	6% women out of 190,000 registered and licensed engineers
Viet Nam	No data

Table 3: Gender Composition in the Engineering Profession in ASEAN.

4.5. Issues Affecting the liberalisation of Engineering Services

Based on the aforementioned discussion and analysis, ASEAN and AMS will need to address several issues in order to ensure success in the liberalisation of the engineering profession.

a. Relationship between MRA, Commercial Presence and Movement of Natural Persons

In the context of professional service providers in ASEAN, MRA enables the qualifications of services suppliers recognised by the relevant authorities in their home country to be mutually recognised by other signatory AMS. This promotes the flow of professional services providers within ASEAN, in accordance with relevant domestic rules and regulations. In addition, simple, harmonised and standardised trade instruments including MRAs are expected to reduce transaction costs. However, based on the survey, especially the AMS Schedules of Commitments under AFAS, AMS need to address issues relating to commercial presence (Mode 3) such equity ownership and board of director requirement and cross-border movement of the professional engineers under Mode 4.

In an ideal liberalisation scenario, recognised providers of engineering services should be able to move between AMS under Modes 3 and 4. The increase in commercial presence under Mode 3 and the movement of natural persons under Mode 4 in professional engineering services may result in an increase in intra-ASEAN investment in services, which will enhance ASEAN's attractiveness as an investment destination. An increase in intra-ASEAN investment in professional services may in turn lead to higher investment by professional service providers from outside ASEAN as a result of increased professionalism and confidence in the transparency and good governance attributes of the rules relating to professional service providers in ASEAN.

At the same time, an increased liberalisation under Mode 4 will allow greater mobility of engineers to work across ASEAN. This will assist ASEAN to deploy talents within the region and will assist AMS who need the talents not always available locally to recruit professional engineers from neighbouring AMS. The result is intra-ASEAN co-operation which provides greater access to engineering expertise.

ASEAN Member States are generally well-disposed towards liberalisation of trade in services under Modes 1 (cross-border supply) and 2 (consumption abroad). However, AMS are more cautious with regard to commercial presence under Mode 3 and the temporary movement of natural persons under Mode 4. In commercial presence or Mode 3, many AMS require commercial entities of professional service providers to have a minimum of 51% shares owned by the national or permanent resident of the Member State.

At the same time, there is a need to have a minimum number of members of the board or executive committee members, who must be registered professionals in the AMS concerned. Many of the laws, rules and regulations in AMS do not provide clear guidance on the rights of professional engineers to provide services under Mode 4, and this lack of clarity may play to the disadvantage of foreign professional service providers and deter use of agreed MRAs.

On the other hand, many of the regulators and members of the professional service providers met during the field work welcome working together with their counterparts from other ASEAN Member States. Such co-operation and collaboration lead to liberalisation in Mode 1 and Mode 4, but will have less liberalising effect on commercial presence (mode 3).

Collaborations through Mode 4 should be encouraged as the MRA on Engineering Profession works as a provider of quality assurance that the professional counterparts will have mutually recognised qualification and quality in education and experience. For example, an ASEAN Engineer would provide an assurance that a particular person has the qualification, quality and experience in providing the required service, most probably through collaboration, co-operation or joint ventures between the relevant service providers in the AMS.

b. The need to comply with the immigration rules and MNP Commitments

Movement of natural persons under Mode 4 could be facilitated under the MNP Agreement. For the time being, although a foreign engineering service provider may participate in the equity of a firm, this does not automatically entitle the equity holder to obtain the necessary immigration clearance to work in the host AMS.

However, at the time of writing, the MNP agreement only deals with business travellers and intra-corporate transferees, leaving those who seek employment having to go through the normal immigration and work permit process.

In addition, business travellers and intra-corporate transferees will have to understand different levels of commitment made by AMS under the MNP Agreement. For example, Brunei allows entry for intra-corporate transferees up to a three year period that may be extended for up to two additional years for a total term not to exceed 5 years. There is no special commitment on the engineering profession.

In Cambodia, intra-corporate transferees are required to obtain temporary residency and work permit. Such permits are issued for 2 years and may be renewed annually up to a maximum of total 5 years. Lao PDR on the other hand imposes labour quota, where a firm may employ foreign engineers but not more than 20% of the total staff. An establishment may request for a higher quota.

In Indonesia, intra-corporate transferees namely Executive, Manager and Specialist may be granted stays for up to 2 years which can be extended for a maximum of 2 times, with each extension being up to 2 years. Any foreign natural persons supplying services are subject to charges levied by the Government. Economic needs test applies to temporary stay of manager and specialist.

Malaysia allows intra-corporate transferee executives, specialists and experts a stay of not more than 10 years. The Philippines normally allow 1 year renewable permit for intra-corporate transferees (executives, managers and specialists). Foreign engineers may be allowed to practice in the Philippines and take licensure examinations if the foreign country where the engineer is a citizen admits Filipinos to practice the same profession without restriction or by way of examinations on equal terms with foreign citizens including unconditional recognition of degrees or diplomas.

Singapore generally allows intra-corporate transferees to stay to a 2 year period that may be extended for up to 3 additional years each time for a total term not exceeding eight years. Thailand allows intra-corporate transferees temporary stay which is limited to a 1 year period and may be extended for a further three terms of not more than 1 year each. Both Singapore and Thailand do not provide any sectoral commitment.

Viet Nam grants entry and permit for intra-corporate transferees, managers, executives and specialists, for an initial period of 3 years which may be extended subject to the term of operation of those entities in the country. Viet Nam imposes conditions that at least 20% of the total number of managers, executives and specialists shall be Vietnamese nationals. However, a minimum of 3 non-Vietnamese managers, executives and specialists shall be permitted per enterprise.

c. Different Levels of Development/ Readiness

The different level of development between AMS may affect potential uptake in mutual recognition and the readiness of the engineering service providers in undertaking cross border services.

It could be argued that the engineering service providers in the more advanced AMS will be more ready to undertake cross-border services within ASEAN thus will be more likely to seek mutual recognition for their qualifications as compared to professional service providers from the less advanced AMS. Based on the field work and the desktop survey, we found that the newer AMS such as Cambodia, Viet Nam and Lao PDR are in the midst of updating their domestic regulations in various professions, including in engineering.

05.

**PRACTICAL
RECOMMENDATIONS
AND CONCLUSIONS**

Based on the abovementioned discussion, we make the following recommendations:

- a. ASEAN and AMS will need to find the best model to further enhance the movement of professional service providers within ASEAN. This Handbook discussed four different models of mutual recognition and the best practices could be compared with the practices in the EU/TTMRA and NAFTA models. The EU Model, on which the TTMRA is modelled, may not be suitable for ASEAN due to the disparity and gap in the economic readiness and the competency levels of professionals across ASEAN. The TTMRA involves Australia and New Zealand, two countries sharing much the same heritage, culture, language and educational systems. The EU also involves legally binding provisions in a closely integrated market where the twin freedoms of establishment and of service provision are enshrined in a treaty that is subject to the binding decisions of a supranational court of justice.
- b. ASEAN Member States are arguably closer to the model developed by Parties to the NAFTA, which groups together countries that display greater contextual heterogeneity. The NAFTA-type MRA model is already reflected in the ASEAN MRAs which adopt a sectoral approach rather than the generic approach pursued in the EU. In emulating the NAFTA model, AMS will have to allow recognised professionals to obtain work visas so long as they can first land a service contract in another AMS or work via an established presence in another AMS and possess recognised qualifications. This means that the recognition of qualifications would lead to freedom of movement under the MNP Agreement if one can find a temporary work contract in another ASEAN Member State. Thus, visa and temporary work-related arrangements should be automatic and not a hindrance to the movement of natural persons under Mode 4.
- c. To encourage intra-ASEAN investment, the provision of professional services could be linked to the further liberalisation of investment under the ASEAN Comprehensive Investment Agreement (ACIA). ACIA liberalises investment in five sectors and services incidental to them, namely manufacturing, agriculture, fishery, forestry, mining and quarrying. Thus, the engineering profession should be allowed to have a higher degree of freedom in terms of ownership and other guarantees offered by ACIA in order to enhance cross-border trade in engineering services within ASEAN.
- d. Liberalisation efforts under AFAS, through the MRA and under ACIA should be further encouraged. Member States should further liberalise Mode 3 participation by liberalising, either through ACIA, AFAS or through autonomous liberalisation. They should also promote intra-ASEAN joint ventures, mergers and acquisitions and commercial collaborations in professional services. Most AMS encourage collaborations but this could be enhanced by creating ASEAN-wide firms consisting of ASEAN professional service providers owned by ASEAN professional service providers. This could be in the form of single profession or multi-practice firm.
- e. The foreign ownership of professional firms in ASEAN Member States should be re-classified in order to enhance Mode 3 investment and Mode 4 movement under the MNP. There could be another category of ownership or equity categorised as “ASEAN citizens” where firms could have a higher percentage of ASEAN citizen equity in the firms as compared to non-ASEAN ownership.
- f. ASEAN and AMS may further wish to consider the scope that may exist for harmonisation in some areas where possible such as academic curriculum, work experience, basic training requirements, requirement for commercial presence for professional service providers and the harmonisation of immigration rules in issuing temporary work permits for professional service providers.

- g. The more developed AMS may also offer needed technical assistance to other AMS in the field of domestic regulations and helping enhance academic curriculum in various professional sub-sectors. The various professional services regulators and the professional associations within ASEAN and AMS should also be encouraged to enhance collaboration among their members. Closer collaboration may lead to a higher degree of liberalisation and facilitate trade-creating normative convergence in the future.

Based on the above discussion, ASEAN Member States can be viewed as working towards a higher level of integration and liberalisation of trade in professional and engineering services. This is evidenced by the fact that AMS are increasing the level of transparency of domestic regulations affecting the various professions covered by these Handbooks. Member states like Brunei Darussalam, Lao PDR, Myanmar and Viet Nam are in the process of preparing and adopting new domestic regulations for the engineering profession.

A higher level of integration and liberalisation may also be achieved through closer collaboration between the AMS, especially in encouraging collaboration among relevant professionals through Modes 1 and 4. At the same time, AMS should increase the participation of intra-ASEAN market access and investment in professional services through Mode 3. An improvement in Modes 3 and 4 market access will enhance the availability of technology, expertise and capital among ASEAN professionals in order to allow them to better compete with professionals from other parts of the world, both within and beyond South-East Asia.

In conclusion, the determination shown by the engineering profession to achieve a higher level of integration and liberalisation in ASEAN will assist ASEAN and the AMS to realize ASEAN Economic Community objectives in 2015, which could mark the beginning of a deeper process of ASEAN-wide economic integration.

Abbreviations

Abbreviation	Full Name
ACPE	ASEAN Chartered Professional Engineer
AEC	ASEAN Economic Community
AFAS	ASEAN Framework Agreement on Trade in Services
AMS	ASEAN Member State
ASEAN	The Association of Southeast Asian Nations
AQF	Australian Qualification Frameworks
CCS	Coordinating Committee on Services of ASEAN
EC	The European Community
EU	The European Union
GATS	General Agreement on Trade in Services of the WTO
MRA	Mutual Recognition Agreements
PE	Professional Engineers
PRA	Professional Regulatory Authority
PTA	Preferential Trade Agreements
TTMRA	Trans Tasmanian Mutual Recognition Agreement
UK	United Kingdom of Great Britain and Northern Ireland
UNCTAD	United Nations Conference on Trade and Development
USA	The United States of America
WTI	World Trade Institute, University of Bern
WTO	World Trade Organisation



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