

## **EXISTING WORLDWIDE CERTIFICATION LEGISLATION AND SAUDI ARABIAN INTEGRATION**

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### **Abstract**

Existing Certification processes and legislation are already in place in the majority of countries of the world, and various Treaties, Mutual Recognition Agreements, Accreditation arrangements, and Mutual Cooperation Agreements link these countries into a worldwide community of engineers. It is to the advantage of Saudi Arabia to join an existing, worldwide, framework of Certification, as this will allow the free movement of labour under World Trade Organization rules both inward to Saudi Arabia, and outward by Saudi engineers.

There is a need for a minimum qualification level to be set for the Certification of all Engineers working in Saudi Arabia, and which should be applied equally to expatriates and Nationals alike. Using the existing world standards, Saudi Arabia can establish the required minimum entry levels, continued professional development requirements, status, and legal liabilities, of Certified Engineers.

By joining this worldwide movement, Saudi Arabia will have a datum against which to measure their own Certification of Engineers.

By adopting these worldwide standards, expatriate engineers working within the Kingdom can be regulated fairly by the Saudi authorities, and Saudi engineers can become accepted in other countries, all in accord with World Trade Organization principles.

The draft Royal Decree for the Certification and Control of Engineers, which has been formulated by the Saudi Engineering Committee of the Chamber of Commerce, is based on a number of existing models from other countries, and conforms to the general standards found in other countries. This Decree should be the basis of the discussions held at the Symposium.

### **Introduction**

The Invitation to the Symposium correctly points out that "the engineering body comprises a multinational workforce having a diverse educational background and professional preparedness".

The engineering workforce in the Kingdom is made up of many nationalities, allowing a wealth of experience from overseas to be harnessed by the Saudi engineer. The expatriate engineers have followed rigorous academic and training routes, imposed by the Licensing bodies in their home countries, to achieve professional status. This hard earned competence is recognised by the "home country" governments, by the issue of Licences.

Some countries have nearly 200 years experience in setting standards and regulations for engineers. As Saudi Arabia is starting the establishment of a certification system from scratch, it has a wonderful opportunity to consider and compare the existing systems in the world, and develop a fair and equitable certification system, which will be accepted and recognised by other countries.

Saudi Arabia should take the best of other systems, and pass legislation to enable Saudi, and other Nationals, to practice as Licenced engineers in Saudi Arabia.

Once the Certification system is in place, Saudi Arabia can have their system recognised by other countries, thus allowing Saudi engineers freedom to work in these other countries. In return, Saudi Arabia will be able to Licence engineers of other nationalities to work in the Kingdom, when the overseas qualifications match or exceed Saudi minimum requirements.

Saudi Arabia will be able to apply to join with other countries, in Mutual Recognition Agreements and other Treaties, and become part of the worldwide community of engineers as an equal partner.

The World Trade Organization movement is impacting on all countries, whether members of the WTO or not. One of the ideals of the WTO is the free movement of labour across borders. Licencing of engineers, to a world benchmark standard, followed by Mutual Recognition Treaties and the like, will allow this movement of labour. However, it is understood that economic migration has to be regulated, so that nationals have a fair chance of employment in their own countries. With fixed standards for certification, fair rules can be applied to non-nationals applying to work in the Kingdom.

Equally, with the growth of the Saudi population, it can be foreseen that there will come a time when Saudi engineers will want to work outside the Kingdom. If Saudi Arabia is a party to Mutual Recognition Agreements, then Saudi Certified engineers will be equally acceptable in other countries.

The base of all Certification is the academic standard to be achieved by the Graduate Engineer. The choice of syllabi, content and the pass grade required, is extremely important. These have to be matched to the actual requirements of the industry, so that the Graduates are of immediate use in the workforce. For this reason, Universities have to be examined by independent external examiners before becoming "Accredited" to the government licencing body of each country.

## **History of the Requirement for Certification**

In 1818, a group of British Civil Engineers met to discuss the regulation and certification of practicing civil engineers in the United Kingdom. They understood that proper training of engineers was necessary for the safety of the public when works are undertaken, and to inspire confidence in the government and clients who were funding projects. They realised that minimum standards (academic and professional) are required to make a successful professional engineer.

This group laid down requirements and rules which, over a 10 year period, evolved into The Royal Charter granted to The Institution of Civil Engineers in 1828. This Royal Charter gave legal status to the rules and regulations. It confirmed that the only people capable of regulating engineers, were other engineers. There was to be no interference from other non-engineering organisations. The result is that engineers can be held accountable for their actions, and can be disciplined by the Licencing Authority (which is operated by engineers). Equally, this gave the engineer status within the community.

The rules and regulations were defined by engineers for the benefit of the general public and for the engineers themselves, and have been modified during succeeding years as science, technology, and the world requirements have changed.

It is interesting to note that this example of professionals operating a "self-regulation" system became the role model for other professions. The British Medical Association copied the Institution of Civil Engineers system, and was granted a Royal Charter in 1847 (some 19 years after the Civil Engineers!). Since then, the Medical Professions in many other countries have copied the BMA system. Indeed, the Saudi Medical system is based on the British system, and is already part of Saudi Law.

In France and Portugal, similar movements in the 19th century produced government regulations for the control of engineers. Other countries have followed the lead of the original British engineers.

Unfortunately the United States did not follow this example. Because of the Federal system, with States being semi-autonomous, this has resulted in a fragmented system. The "United" States are NOT united when writing laws, and this has resulted in (currently) some 58 separate State and City Licencing bodies, each with differing standards and requirements.

This severely limits the movement of engineers between States, and prevents other countries reaching any kind of Mutual Recognition Agreement to cover the whole USA. Thus, USA Professional Engineers (PE) are not covered by Mutual Recognition Agreements, and should have to individually apply for an additional Licence in another country before being allowed to work. Non-US Licenced Engineers, working in the USA, are required to hold a Licence for each State in which they work, which presents an unnecessary burden.

Regrettably, Canada followed the USA example, and there are now at least 6 Provincial Licencing Boards. However, they have standardised requirements and this has allowed Canada to set up Mutual Recognition Agreements with other countries.

Australia, New Zealand and Hong Kong have National Boards, based on the British system. The Philippines system is based on the USA examination system, but there is only one National Board for each discipline. This allows a direct comparison with other countries.

Russia, India and China are forming National Boards, based on the UK system.

### **Routes to Certification**

Countries that already have Legislation in place for the Licencing of Engineers have very similar requirements, in general terms. These requirements include a sound basic University Degree, in appropriate subjects to the engineering discipline, followed by a period of work under

proper supervision by a senior engineer of the same discipline, and culminating in a Professional Review examination to assess the candidate's suitability to become a Licenced Engineer.

Figure 1 is a description of the five routes to Certification expected for Saudi Arabia.

Please note that :

1. Graduate Engineers will be either Saudi Nationals, or from other countries.
2. Universities will be either Accredited, or Not Accredited.
3. Certification can also be achieved by mature engineers without degrees.

A mature engineer, who has many years of experience in his field but who does not have a recognised academic base, can also be considered for Certification. These engineers should not be excluded merely because they entered the workforce directly from school, or from another career. In many ways, these engineers are more valuable than a fresh Graduate, as they have a gained wealth of experience before applying for Certification.

### **Minimum Academic Standard**

Britain is now introducing a requirement that Chartered Engineers will have to have a Masters Degree in their discipline's subject. This is because it has been recognised that the basic Bachelor Degree has become "diluted" in recent years, and no longer is considered of a high enough standard for the Professional Engineer. The new Professional Engineer will lead the direction of the industry, making the major decisions, and controlling the work.

The basic UK Bachelor Degree will, in future, only be acceptable for a lower, second tier, level of membership of a professional body. This lower level will be equivalent to a "Technician Engineer". As the great body of work in industry is performed by people of "Technician Engineer" standard, this will not change the current arrangements.

### **Minimum Post-Graduate Training Requirement**

A realistic number of post-graduate years must be served "under training" before a Graduate can be considered for Certification. The graduate must be given a firm grounding in all aspects of his chosen career, under strict supervision, to prepare him for becoming Licenced and being allowed to act independently.

The (Draft) Royal Decree for the Regulation of Engineers does not specify a period under training/supervision although it does state that Member Engineers can supervise a maximum of two Graduates. The document specifies a minimum of 4 years from Graduation to Professional Engineer status (See Figure 2).

In U. K., the period of training is three years on a formal training scheme. (Should a graduate not have a formal training arrangement, then the requirement is increased to a four year minimum period.) However, in U.K. the average actual time between Graduation and Professional Engineer status is nearer 7 years.

## **Problems arising from Non-Accredited Saudi Arabian Universities**

Currently, no Saudi University has been fully accredited to any Examining Body from any other country. Therefore, these other countries are only able to assess the performance of an individual Saudi Graduate by requesting that the applicant sit further papers in certain engineering subjects. This allows the applicant to demonstrate his knowledge against a known benchmark in the overseas country.

Individual Saudi engineers can gain acceptance of academic standard by individually applying to other "Engineering Councils" in Europe and elsewhere, and meeting these standards required by passing additional papers set to prove the applicant's standard.

British Aerospace Limited has a number of good Saudi Mechanical Engineering graduates, and wishes them to gain further qualifications. These men have applied to British Engineering Institutions for membership. The entry requirements include possession of an "approved degree" to show the required level of academic achievement. As the Saudi Universities are not listed as "approved", these individuals are required to sit a further three papers in Mechanical Engineering, and present a Project Report, to prove their standard to the UK authority.

If the Saudi Universities had gained Accreditation, then this additional study and examination would not be necessary. This additional work is placing a great strain on the individuals concerned. It is satisfying to be able to report that the engineers are gaining pass grades in these additional papers.

The above is but one example of the additional burden carried by those Saudi Engineers that want to gain further engineering qualifications that are accepted in the rest of the world, but who are penalized because Saudi Universities are not accredited.

There is another method being employed in Saudi Arabia, to avoid individual study for these "Top-Up" examinations. Graduates can attend a "Post-Graduate" College. These colleges provide courses for groups of graduates to sit the required "Top-Up" papers for the overseas authority. One such College is the International Development Institute, Riyadh.

## **Matching the Product to the Industry Requirements**

The Graduate produced by any University, in any country, must be of such a standard that he can be of maximum use to the industry of that country, with minimal further training.

Any country requires its labour force to perform specific duties and tasks, to further the aims and requirements of the country. For example, if the country requires engineers to develop the infrastructure, then the Universities must produce Graduates with in-depth training in infrastructure development subjects.

It is essential, therefore, that the Government first sets the task requirements, and that Industry then sets the manpower requirement to meet those tasks. Only then can the Universities correctly match course content to these requirements and produce Graduates with the correct academic training for the tasks set by the country.

It is counter-productive for individual Universities (and Departments) to select and operate syllabi that have little or no relationship to the country requirements. This only leads to the production a number of "unemployable" Graduates because there are no jobs available to match the subjects taught. This increases the use of overseas Engineers to cover the shortfall. Meanwhile, the



unemployable Graduates become increasingly frustrated and become an embarrassment to the Government. The education costs have been wasted, and the Graduates will be lost to the industry.

If Saudi Universities studied the Government requirements, to analyse the type of work detailed in the successive 5 Year Plans, they would be able to identify the specific disciplines that require Graduate Engineers. By discussion with leaders of the various Industries, the numbers of Graduates, in each discipline can be determined, together with the specific areas of specialization that need to be covered.

The number of students in each annual University intake must be controlled so that the correct quantity of Graduates is produced. An over, or under, production of Graduates should be avoided, if possible. Over production of Graduates in any one discipline will require that the surplus are re-trained in another discipline. Under production will require the use of expatriate engineers to cover the shortfall, or the use of surplus Graduates from other disciplines after costly re-training.

The Universities must accept that they exist to serve industry by supplying a correctly trained workforce. They cannot stand separate from the needs of the country. Research tasks undertaken by Universities must be part of the needs of the country, and not merely undertaken for the sake of research. If research is done for the benefit of the country, then funding from industry and government is justifiable and will become more easily available.

### **Suitability of Graduates for Work**

Worldwide, the Universities have a great responsibility to prepare the Graduate so that he functions in such a manner that he is of immediate use and benefit to his employer, and to his country.

Ideally, he should have been introduced to his duties by a period of "Work Experience" with a potential employer. This will also test whether the student is suited to the chosen profession. Should the employer decide that the student was unsuited to the work, then the University can divert his studies to a more suitable course. Equally, the student may decide, having been exposed to the work, that he would not like to continue this course of study.

Many European Universities operate a "Sandwich" course, with approximately one year of the University course being spent on full-time employment. This employment period is carefully monitored by academic staff, and by a Training Officer of the employing company. A carefully structured Training Plan is used to ensure that the Student gains the maximum benefit from this "Industrial Attachment" period.

An alternative to the formal "Sandwich Course" is for the student to work in industry during vacations.

With, or without, the "Work Experience" the student must be shown all that he will be required to do in his chosen profession. Ideally, University Lecturers in Engineering should have had a number of years industrial experience. Only by giving examples from "real life" can the full understanding of engineering be gained.

Practical, day-to-day, work is very different to academic study, and the necessary mental discipline must be instilled into the student if he is to become a useful engineer.

The Graduate must understand, and accept, that his formal training is ongoing for several years after Graduation. To become a Professional (Licenced) Engineer, a number of years served under a Professional Engineer as part of a structured training arrangement are the requirement of Licencing in all other countries. Saudi Arabia has proposed a similar period of training in the (Draft) Royal Decree for the Regulation of Engineers.

Further, the Graduate must undertake "Continued Professional Development" for the remainder of his professional life. This includes private study, attending lectures and seminars, in-house and external courses, and any other method of increasing his own knowledge of his subject. Employers understand the need for this continual programme of self-enhancement, and often provide courses on matters that affect the business of the employer. Science and technology is advancing at such a rate that there is always something new to be learned.

### **Accreditation Procedures and Accreditation Organizations**

Accreditation is the process under which a professional body sets academic standards and then assesses if an academic institution meets those standards.

Accreditation of Saudi Universities can only come after the University has invited an external team to inspect the whole University curricula and syllabi. Saudi Universities must first examine themselves, using overseas criteria, and adjust the courses where required. International Benchmark standards exist, and have been developed over many years. These are the standards that overseas countries use to assess Graduates, and Saudi should use these standards to decide on minimum standards for Saudi University degrees.

Saudi Universities should contact one of the Accreditation Boards and request an inspection. The American accreditation board (ABET) is not allowed to give any FORMAL Accreditation to non-USA Universities, and therefore should not be considered.

UK Accreditation bodies include the following.

- a) The Joint Board of Moderators  
Telephone (0044) 207 665 7722  
Covering the following branches of engineering  
Civil, Structural, Building Services
- b) The Degree Accreditation Board for Chartered Engineers  
Telephone (0044) 1284 718672  
Covering the following branches of engineering  
Mechanical, Marine, Mining & Metallurgy, Chemical  
Electrical, Naval Architects, Aeronautics, Etc.

The (Draft) Royal Decree mentions the "Ministry of Higher Education Comparing Committee", whose job it is to match overseas academic qualifications with the requirements of the Kingdom. This Committee should oversee the Accreditation process. This Committee should also advise Universities on the Government requirements for the workforce, and the necessary composition of Degree courses.

## **Registration of Non-Saudi Engineers for work in the Kingdom**

As stated in the Introduction, there are a large number of well qualified expatriate engineers in all sectors of the Saudi Arabian workforce. These engineers have gained Licences in their own countries, after the required academic and training achievements. Saudi Arabia must take these overseas Licences into consideration, and grant equivalent Saudi Licences to these engineers.

The (Draft) Royal Decree submitted by the Saudi Engineering Committee takes this requirement into account. There is a facility for an expatriate engineer to have his own overseas qualifications and licence considered by the Engineering Committee, who will then award an equivalent Saudi Arabian grade. (See the highlighted boxes in Figure 2). Figure 2 shows the Routes to Qualification as laid out in the (Draft) Royal Decree submitted by the Saudi Engineering Committee.

## **Recommendations**

1. Saudi Universities should obtain Accreditation from overseas Boards.
2. Professional standards for licencing of engineers, to be used in Saudi Arabia, should be aligned with those of other countries.
3. The Saudi Arabian Government should establish the correct types and numbers of Graduates that are required to sustain and develop the Kingdom.
4. Universities should amend courses to match Government and accreditation requirements.
5. The Royal Decree should be ratified and passed into Saudi Arabian Law.  
[Note that the decree was approved for Royal Assent by the Shoura Council, in January 2001.]
6. Expatriate engineers should be granted Saudi professional Licences at levels matching qualification requirements of Saudi Arabia.
7. University research projects should aim at the needs of sustaining and developing the Kingdom.

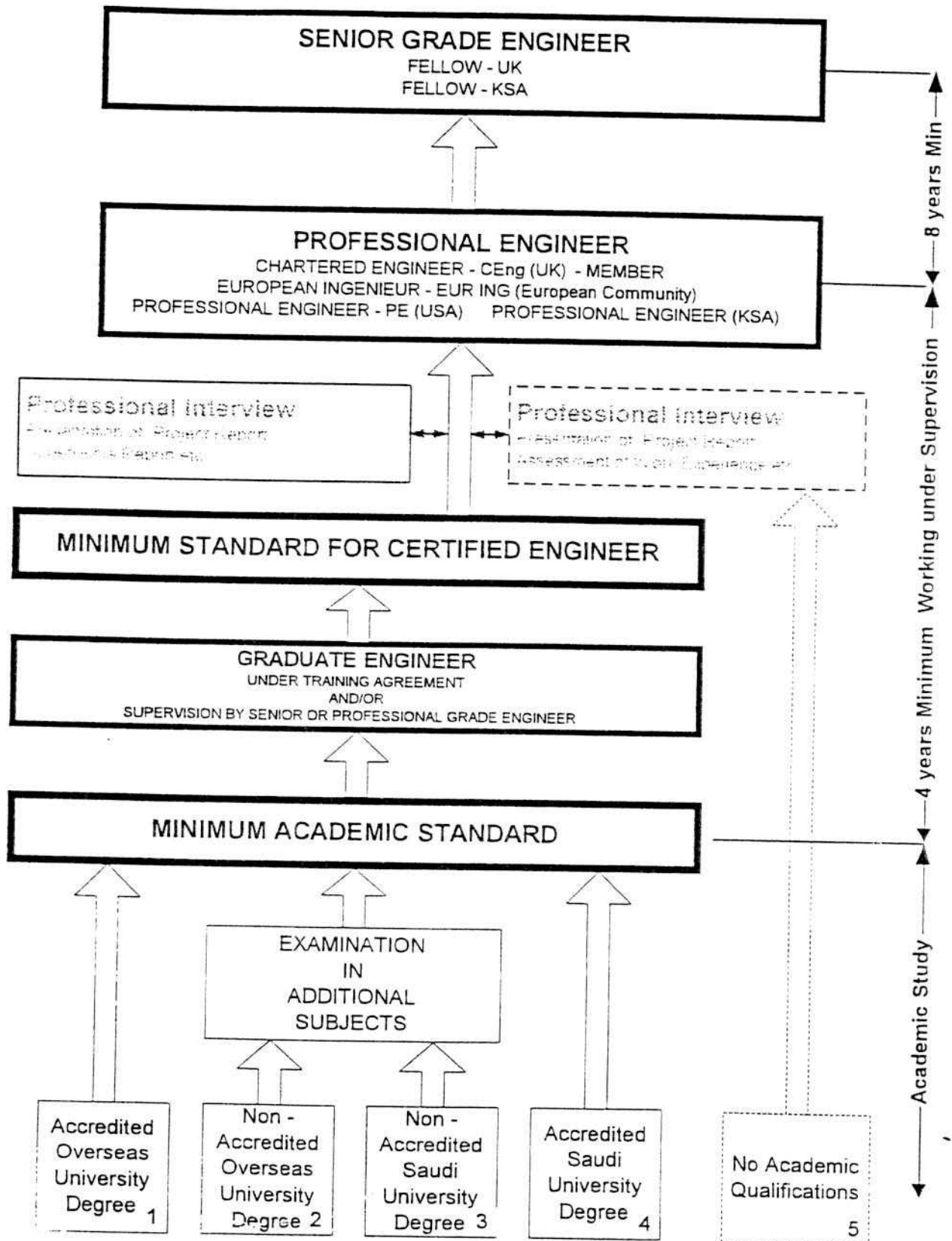
## **References**

1. (Draft) Royal Decree for the regulation of Engineers, issued by The Engineering Committee.
2. "Engineers Professional Title – Why?" Issued with the Draft Royal Decree.
3. "Arab News" 16 January 2001 - Item on Page 2 "Shoura endorses engineers law".



FIGURE 1

# ROUTES TO CERTIFIED ENGINEER STATUS



Certification v2d

FIGURE 2

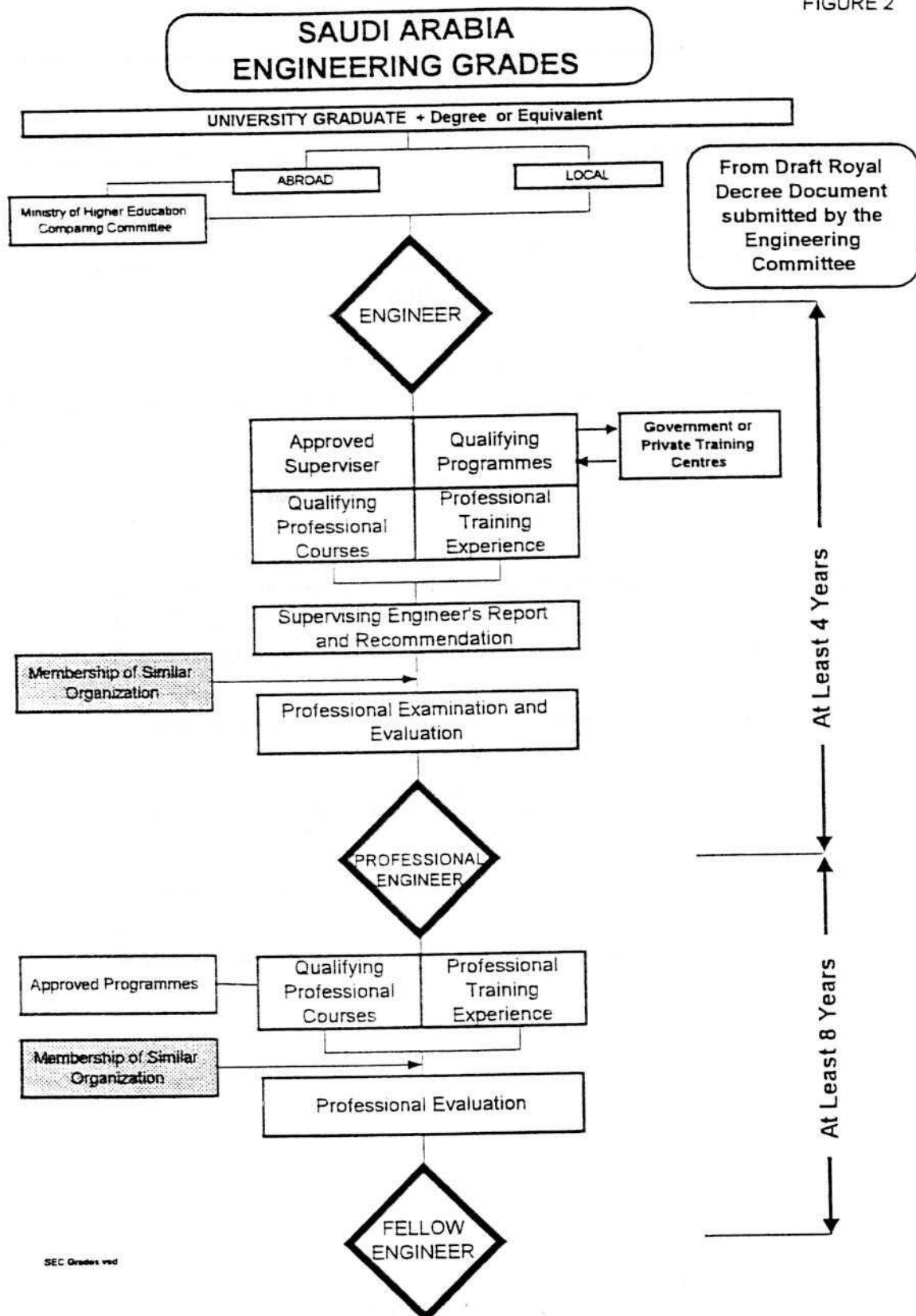


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