



Engineering Practice in the European Union

Lecture No 5.

EU LAWS & REGULATION

**RELATED TO THE ACTIVITIES OF CIVIL
ENGINEERS**

(EUROCODE, FEANI, EUROPEAN ENGINEER)

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MUTUAL RECOGNITION

- ❖ **Directive 89/48/EEC covers the mutual recognition of qualifications in recognised professions that require a University degree or equivalent**
- ❖ **Directive 92/51/EEC covers the mutual recognition of qualifications in professions regulated below University degree level**
- ❖ **The Directives cover all twenty-eight member states of the European Union plus Norway, Iceland and Liechtenstein**



WHAT CIVIL ENGINEERS DO IN THE EU?

- ❖ Infrastructure projects co-financed by the EU requires active contribution of civil engineers
- ❖ Civil engineers create, improve and protect the environment in which we live
- ❖ They plan, design and oversee construction and maintenance of building structures and facilities, such as roads, railways, airports, bridges, harbours, dams, irrigation projects, power plants, water and sewerage systems
- ❖ They also design and build tall buildings and large structures that they can last for hundreds of years and withstand all weather conditions



KEY SKILLS FOR CIVIL ENGINEERS IN THE EU

- ❖ Employers seek creative graduates who are commercially aware and capable of working well within a team environment
- ❖ Other key skills include:
 - ❖ sound mathematical and technical skills including physics
 - ❖ ability to think methodically, to design, plan and manage projects
 - ❖ ability to maintain an overview of entire projects while continuing to attend to detailed technicalities
 - ❖ excellent verbal and written communication skills
 - ❖ negotiating, supervisory and leadership skills combined with the ability to delegate
- ❖ Regulation of activities and licensing of engineers in Europe are handled differently by various countries



POLICIES & LEGISLATION 1

- ❖ **The EU has put in place a comprehensive legislative and regulatory framework for the construction sector**
- ❖ **Health and safety in construction and the free movement of engineering & construction services and products are important policy priorities of the EU**
- ❖ **Concerning the construction activity itself, the focus is on the competitiveness of the sector, not least in the field of sustainable construction**



POLICIES & LEGISLATION 2

- ❖ **European legislation defines the essential requirements that goods must meet when they are placed on the market and the European standards bodies have the task of drawing up the corresponding technical specifications**
- ❖ **CE marking follows the declaration of performance; it indicates a product's compliance with EU legislation and so enables its free movement within the EU**
- ❖ **The free movement of products and services is now facilitated by the EU-wide implementation of common European technical standards for structural design: the Eurocodes**



THE EUROCODES

- ❖ **The EN Eurocodes are a series of 10 European Standards: EN 1990 - EN 1999, providing a common approach for the design of buildings and other civil engineering works and construction products**
- ❖ **The EN Eurocodes are expected to contribute to the establishment and functioning of the internal market for construction products and engineering services by eliminating the disparities that hinder their free circulation within the Community**
- ❖ **Further, they are meant to lead to more uniform levels of safety in construction in Europe**



EUROCODES TODAY

- ❖ **The EN Eurocodes are intended to be used as reference documents to determine the performance of construction products**
- ❖ **After publication of the National Standard transposing the Eurocodes and the National Annexes, all conflicting standards shall be withdrawn in Member States**
- ❖ **It is mandatory that Member States accept designs conform to the EN Eurocodes**
- ❖ **They are currently at the stage of maintenance and evolution in order to address the variety of new methods, new materials, new regulatory requirements and new societal needs developing and to extend harmonisation**



APPLICATION

- ❖ **The EN Eurocodes apply to**
 - ❖ structural design of buildings and other civil engineering works including:
 - ❖ geotechnical aspects;
 - ❖ structural fire design;
 - ❖ situations including earthquakes, execution and temporary structures.
- ❖ **For the design of special construction works (e.g. nuclear installations, dams, etc) other provisions than those in the EN Eurocodes might be necessary**



SCOPE AND COVER

- ❖ **The EN Eurocodes cover**
 - ❖ **basis of structural design (EN 1990);**
 - ❖ **actions on structures (EN 1991);**
 - ❖ **the design of concrete (EN 1992), steel (EN 1993), composite steel and concrete (EN1994), timber (EN 1995), masonry (EN 1996) and aluminium (EN 1999) structures; together with**
 - ❖ **geotechnical design (EN 1997); and**
 - ❖ **the design, assessment and retrofitting of structures for earthquake resistance (EN 1998).**



FAMILY OF EUROPEAN STANDARDS

Design Standards: the Eurocodes

Material and Product Standards:
steel, concrete, structural bearings,
barriers, parapets, etc.

European Technical Approvals:
expansion joints, prestressing tendons,
etc.

Execution standards: execution of concrete and steel structures, etc.

Test standards: testing of concrete, masonry units, fire tests, etc.



FUNDAMENTAL REQUIREMENTS

- ❖ **The structure and structural members should be designed, executed and maintained in such a way that they meet the following:**
 - ❖ ***Serviceability requirement*** – the structure during its intended life, with appropriate degrees of reliability and in an economic way, will remain fit for the use for which it is required
 - ❖ ***Safety requirement*** – the structure will sustain all actions and influences likely to occur during execution and use
 - ❖ ***Fire requirement*** – the structural resistance shall be adequate for the required period of time
 - ❖ ***Robustness requirement*** – the structure will not be damaged by events such as explosion, impact or consequences of human errors, to an extent disproportionate to the original cause



RELIABILITY DIFFERENTIATION

- ❖ Different levels of reliability may be adopted for both, structural resistance and serviceability
- ❖ The choice of the levels of reliability for a particular structure should take account of the relevant factors, including:
 - ❖ the possible cause and/or mode of attaining a limit state;
 - ❖ the possible consequences of failure in terms of risk to life, injury and potential economical losses;
 - ❖ public aversion to failure, and social and environmental conditions in a particular location;
 - ❖ the expense and procedures necessary to reduce the risk of failure.



DESIGN WORKING LIFE

- ❖ The design working life is the assumed period for which a structure is to be used for its intended purpose with anticipated maintenance but without major repair being necessary
- ❖ The notion of design working life is useful for:
 - ❖ the selection of design actions (e.g. wind, earthquake);
 - ❖ the consideration of material property deterioration (e.g. fatigue, creep);
 - ❖ evaluation of the life cycle cost;
 - ❖ developing maintenance strategies.



DURABILITY & QUALITY ASSURANCE

- ❖ **The structure should be designed in such a way that deterioration should not impair the durability and performance of the structure having due regard to the anticipated level of maintenance**
- ❖ **The EN Eurocodes assume that appropriate measures are taken in order to provide a structure, which corresponds to the requirements and to the assumptions made in the design**
- ❖ **These measures comprise definition of the reliability requirements, organisational measures and controls at the stages of design, execution, use and maintenance**



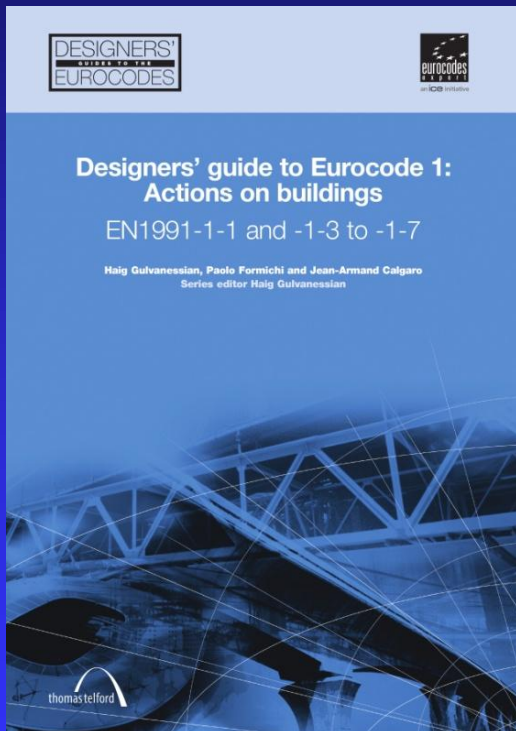
RECOMMENDATIONS RELATED TO THE EUROCODES 1

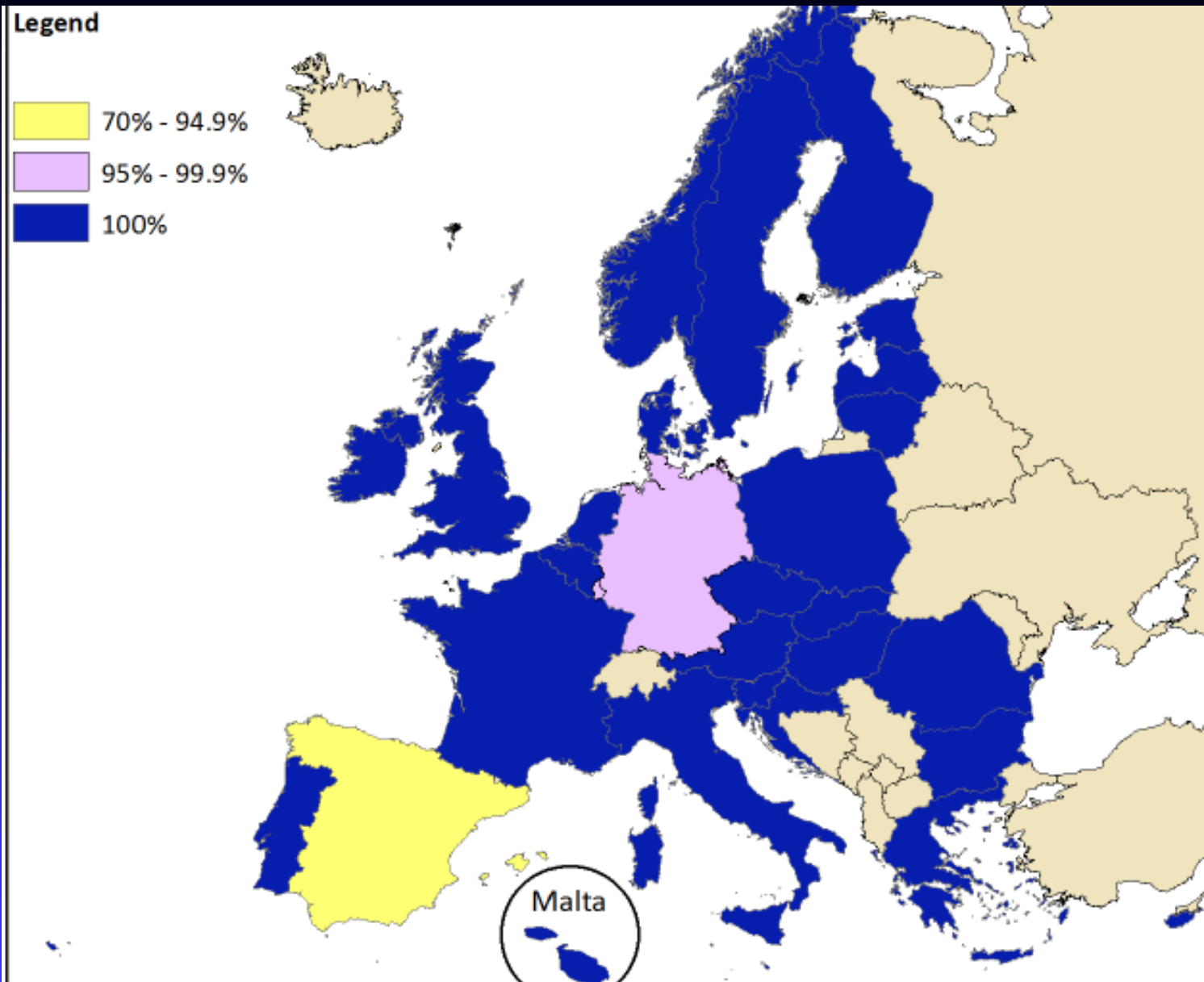
- ❖ **EU Recommendations and Opinions are not binding but express the Council's or Commission's view on policy to the Member States or to the individuals to which they are addressed**
- ❖ **Whilst Recommendations and Opinions are not legally binding, they allow the institutions to make their views known and to suggest a line of action**



EUROCODE PUBLICATIONS

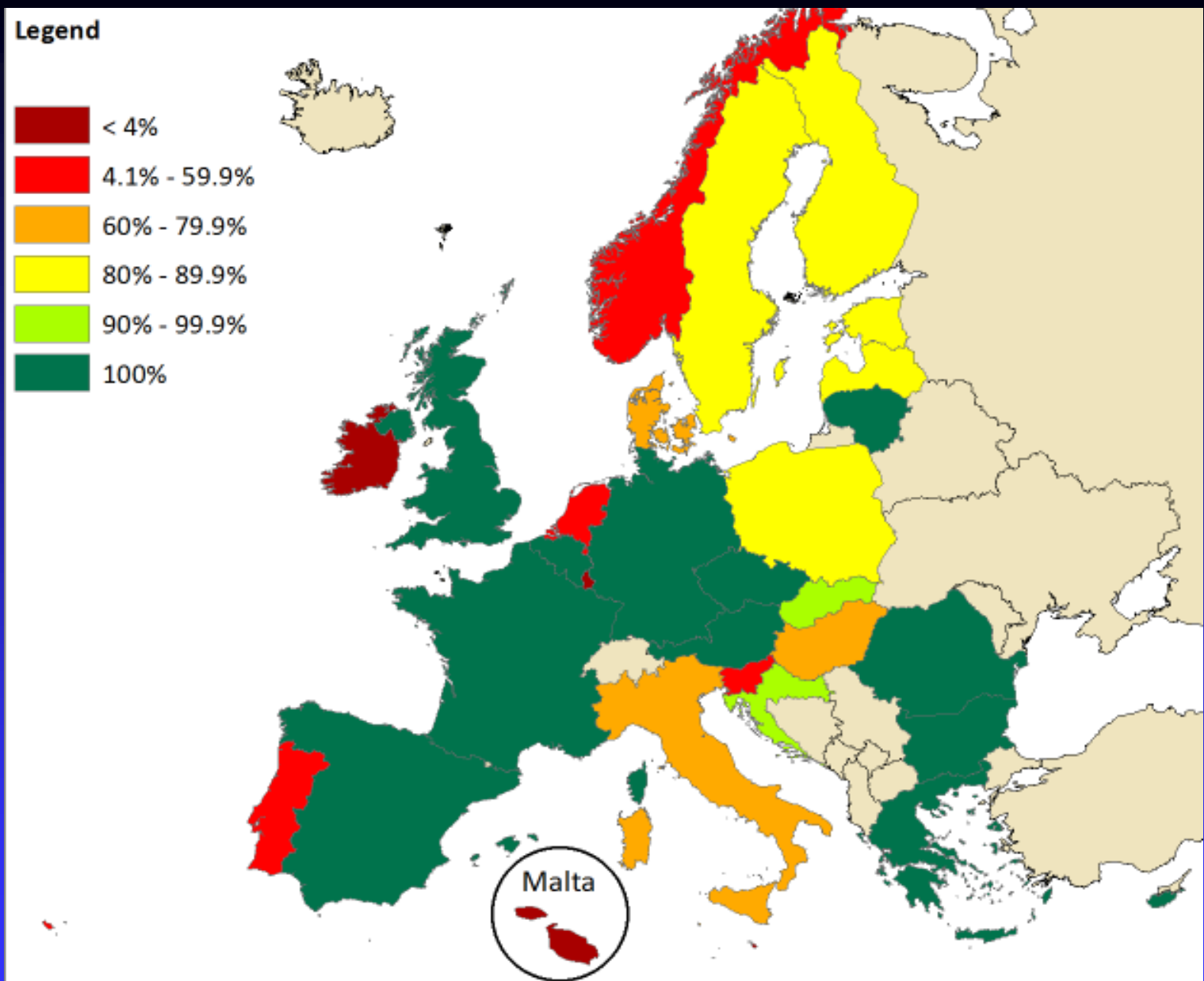
(EXAMPLES)





Publication of National Standards on the Eurocodes in percentage of all Parts

Timár2017



Rate of the Eurocodes Parts available in National Language as percentage of the published Parts

11mar2017



ARE THE EN EUROCODES MANDATORY?

1

- ❖ Under the Public Procurement Directive , it is *mandatory* that Member States accept designs to the EN Eurocodes
- ❖ The EN Eurocodes will become the standard technical specification for all *public works* contracts
- ❖ If proposing an alternative design one must demonstrate that is *technically equivalent* to an EN Eurocode solution



FEANI



- ❖ **European Federation of National Engineering Associations (FEANI) was founded in 1951, a few years after the end of the second world war, by a group of French and German engineers who thought that through technology, their common field of activity, it would be possible to create links between former adversaries and so to facilitate the prosperous and peaceful development of European society**
- ❖ **Today associations from 32 European countries are represented in FEANI, bringing together more than 350 national engineering associations, all of which are recognised in their countries as the representatives of the engineering profession at the national level**



FEANI'S OBJECTIVES

- ❖ **FEANI is officially recognised by the European Commission as representing the engineering profession in Europe**
- ❖ **Objectives:**
 - ❖ **To affirm the professional identity of the engineers of Europe**
 - ❖ **by ensuring that professional qualifications of engineers of the member countries are acknowledged in Europe and worldwide**
 - ❖ **by asserting the status, role and responsibility of engineers in society**
 - ❖ **by safeguarding and promoting the professional interests of engineers and by facilitating their free movement within Europe and worldwide**
 - ❖ **To strive for a single voice for the engineering profession of Europe, whilst acknowledging its diversity**
 - ❖ **in developing a working cooperation with other international organisations concerned with engineering matters**
 - ❖ **in representing the engineers of Europe in international organisations and other decision-making bodies**



FEANI in numbers

32

European member
countries

350

National professional &
scientific associations

3,5-4 million

individual engineers



PRODUCTS

The screenshot shows the FEANI website with the following content:

- Navigation Menu:** ABOUT US, FEANI INDEX, EUR ING, EUR-ACE, ENGINEERING CARD, NEWSLETTER, PUBLICATIONS & AGREEMENTS, EU NEWS, EVENTS & MEETINGS, SERVICES FOR ENGINEERS, LINKS, GALLERY.
- Header:** FEANI logo and "European Federation of National Engineering Associations" with a background image of wind turbines.
- Main Content:**
 - Welcome to FEANI:** A paragraph describing FEANI as a federation of professional engineers from 32 European countries, representing over 3.5 million engineers.
 - ENACEE - Announcement:** Second Annual Conference of the European Network for Accreditation of Engineering Education (ENACEE) in Leuven, Belgium, 16th and 17th of September 2013.
 - FEANI - General Assembly 2013:** The Engineering Institution of Macedonia has the honor to organize FEANI General assembly 2013, which will be held on October 3rd & 4th, 2013 in Skopje, FYROM.
 - WCEE - Call for Papers:** 28th World Congress on Engineering Education (WCEE) in Beirut, Lebanon, 24th and 26th of October 2013.
 - BEST EVENTS - Board of European Students of Technology:** A section for BEST events, including a description of what a BEST event is and a list of seasonal events.
- Footer:** Members section with logos for TEKNIKA and AKAT, and contact information for FEANI A/TEL.

- EngineerING Card
- FEANI INDEX
- EUR ING



engineerING CARD

engineering card
BERUFS AUSWEIS FÜR INGENIEURE

01. Mustermann
02. Max
03. 30.07.1978, Musterstadt
04a. 01.12.2009 04b. 30.11.2019
05. VDI 06. 007

07. *M. Mustermann*

08. **A1A2** **B1** **C1**

www.engineering-card.de

VDI

Studium Academic studies		Datum Date
A1	Bachelor/Diplom [FH]	30.07.2003
A2	Master/Diplom [TU/TH]	27.11.2005
A3	Dr.-Ing.	
Berufserfahrung Professional Experience		
B1	Unternehmen Free Economy	X
B2	öffentl. Dienst Civil Service	
B3	selbstständig Self-employed	
Weiterbildung Further Education		Anzahl Number
C1	Seminar mit Teilnahmebescheinigung Tutorial with Certificate of Attendance	1
C2	Seminar mit Abschlussprüfung Tutorial with Final Exam	
C3	Fortbildung mit Zeugnis Advanced Education with Certificate	

ID Number
07. Unterschrift
Signature
08. Schlüssel für
Qualifikationen
Key for Qualifications
007

Why? Tool for mobility - Validation of academic studies + professional experience + training and further education - Supported by EU directive - r



FEANI INDEX



FEANI INDEX assures the quality of education

- FEANI INDEX is **the only reference** for quality European Engineering Education
- An **independent** database
- **EUR – ACE** programmes are inserted in the INDEX
- List of ~**1,000** HE institutes with ~ **10,000** engineering programmes accredited by FEANI
- programmes fulfil requirements for the **EUR ING** title



EUR ING TITLE

- ❖ **European Engineer (EUR ING, Eur Ing, or Eur-Ing.) is an international professional qualification for engineers used in over 32 European countries; the title is granted after successful application to a national member of the FEANI**
- ❖ **It allows a person who has an engineering degree and usually an engineering professional qualification in one of the EU member countries to use the qualification in others, but this depends on local legislation**





RECOMMENDED READINGS

- ❖ **European Committee for Standardisation (CEN)**

<http://www.cen.eu/about/Pages/default.aspx>

- ❖ **The EN Eurocodes**

<http://eurocodes.jrc.ec.europa.eu/>

- ❖ **European Federation of National Engineering Associations (FEANI)**

<http://www.feani.org/site/index.php>