

OS NOVOS EUROCÓDIGOS ESTRUTURAIS

*Inclui as
Comemorações
dos 40 anos da APEE
e a entrega do Prémio
Ferry Borges 2008*

Lisboa, LNEC, 26 de Novembro de 2008



The Eurocodes General overview – Principles, new developments and future challenges

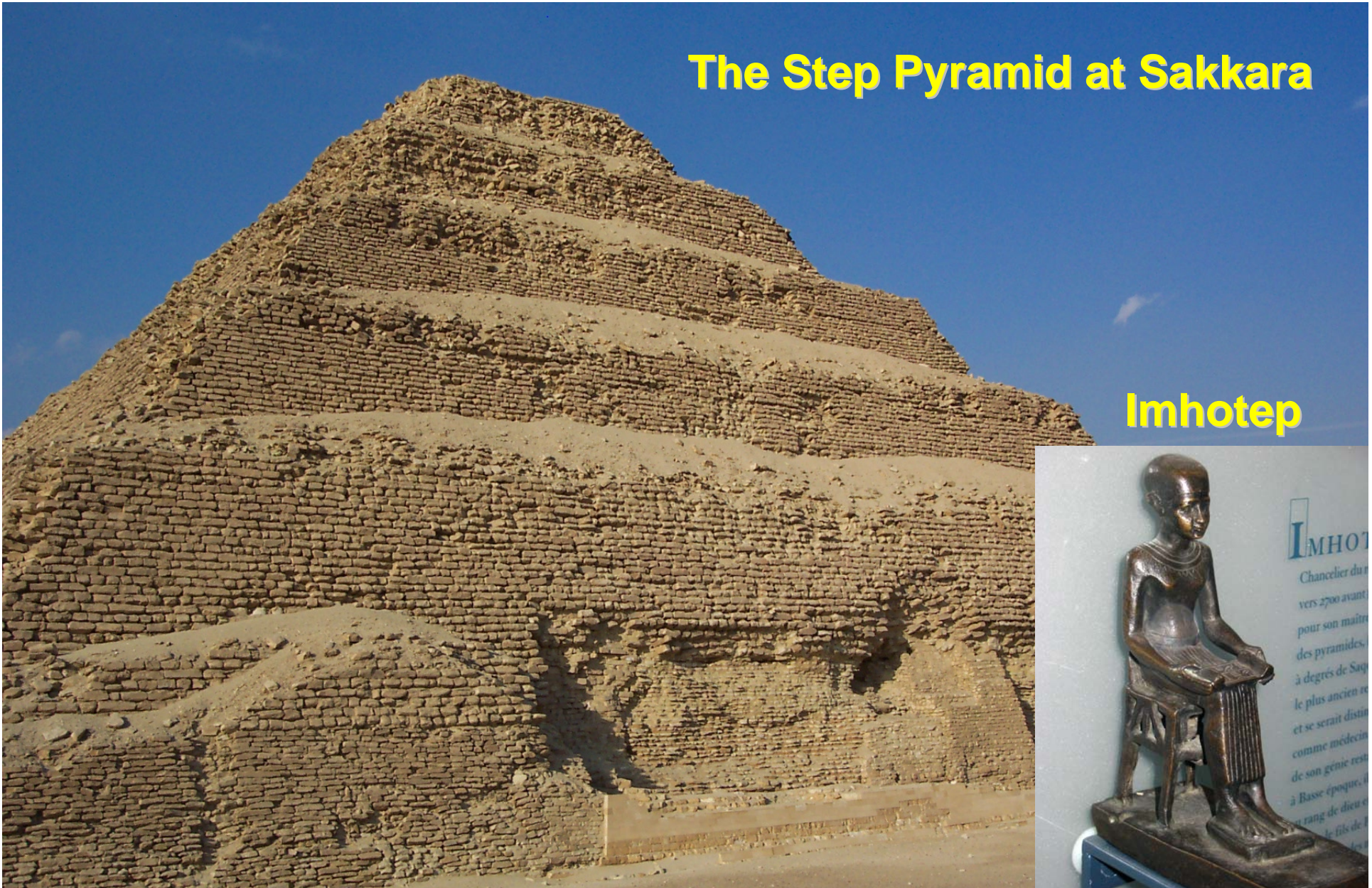
**Jean-Armand Calgaro
Chairman of CEN/TC250**

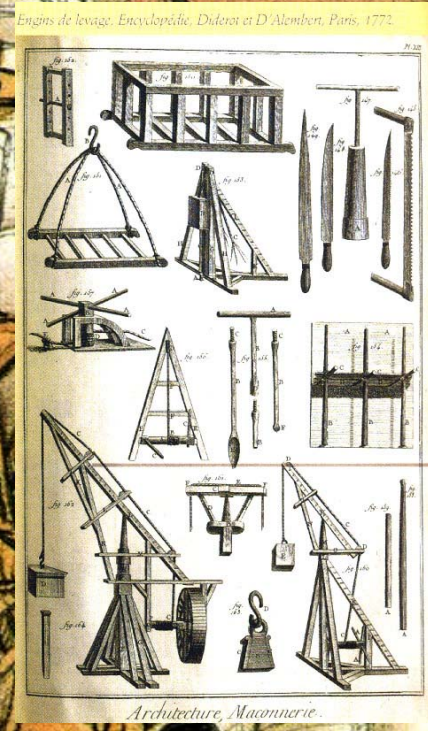


The Eurocodes : General overview – Principles, new developments and future challenges

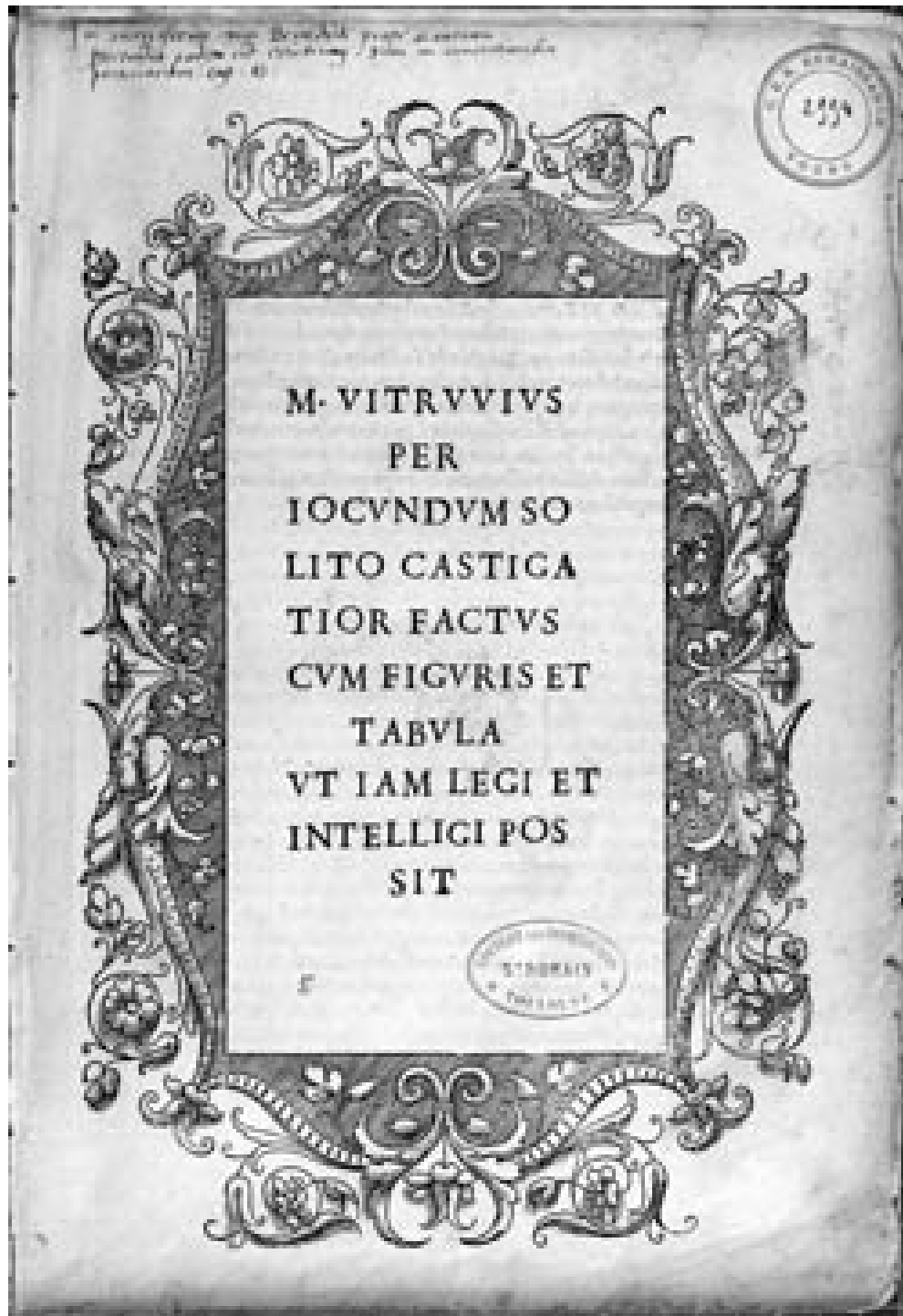
The Step Pyramid at Sakkara

Imhotep







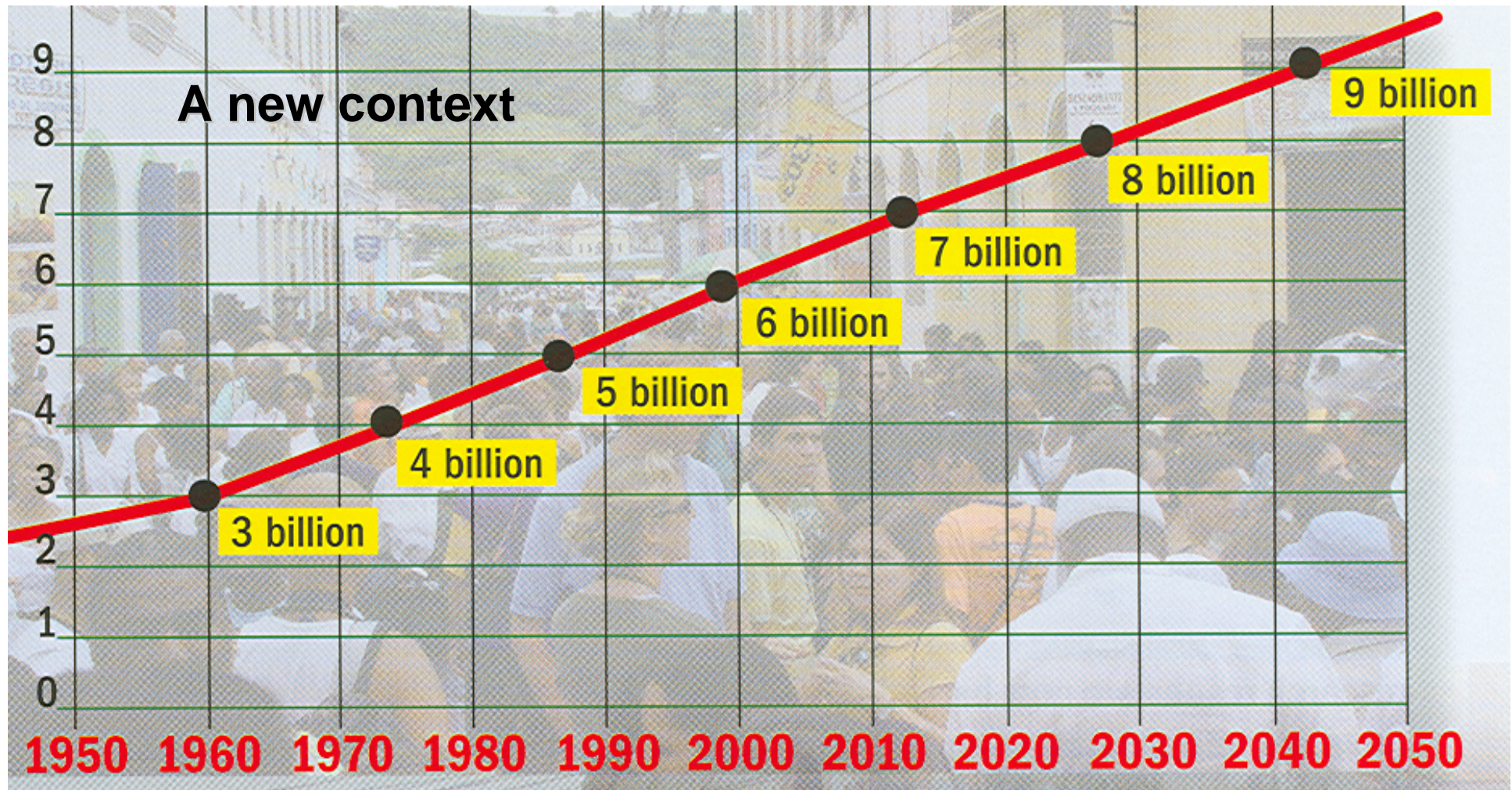


Marcus Vitruvius Pollio

(c. 80-70 BC –
c. 15 BC)

« The Ten books on
Architecture »

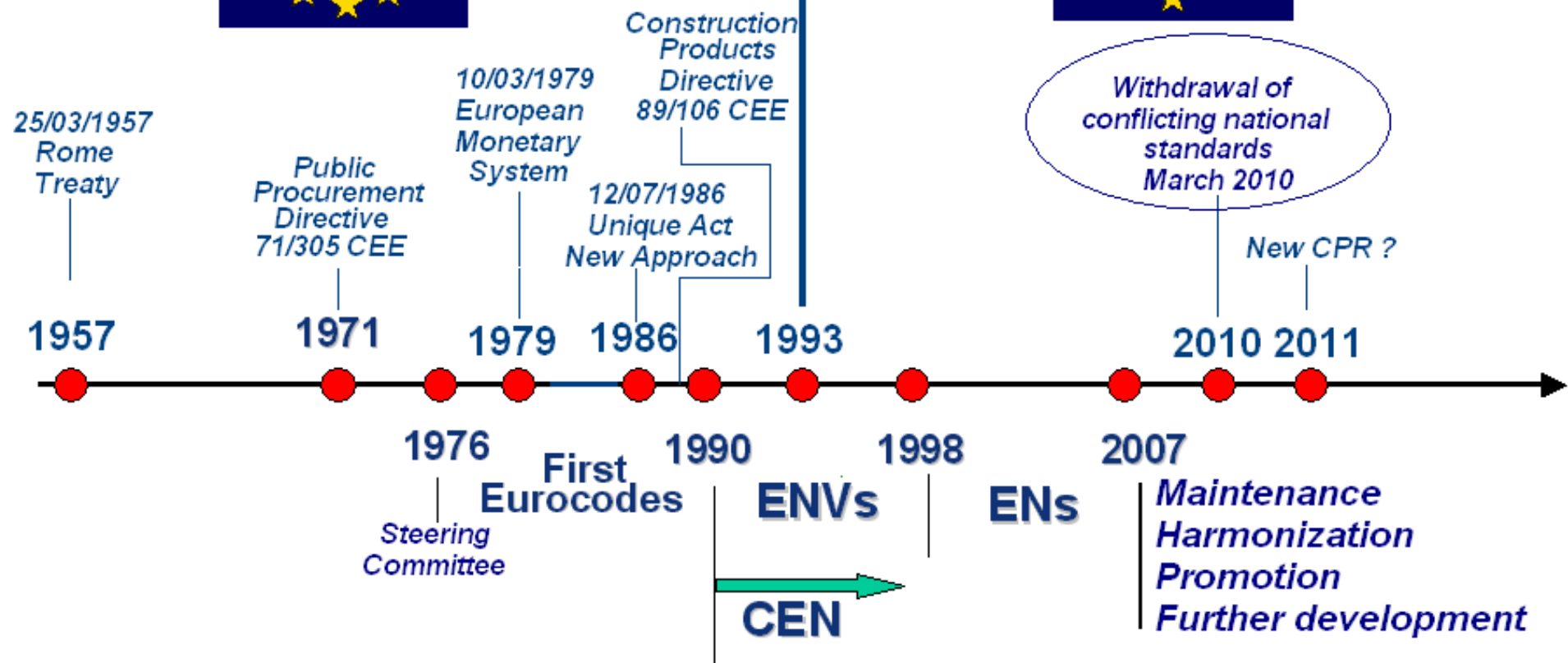




World population (billions) : 1950 - 2050

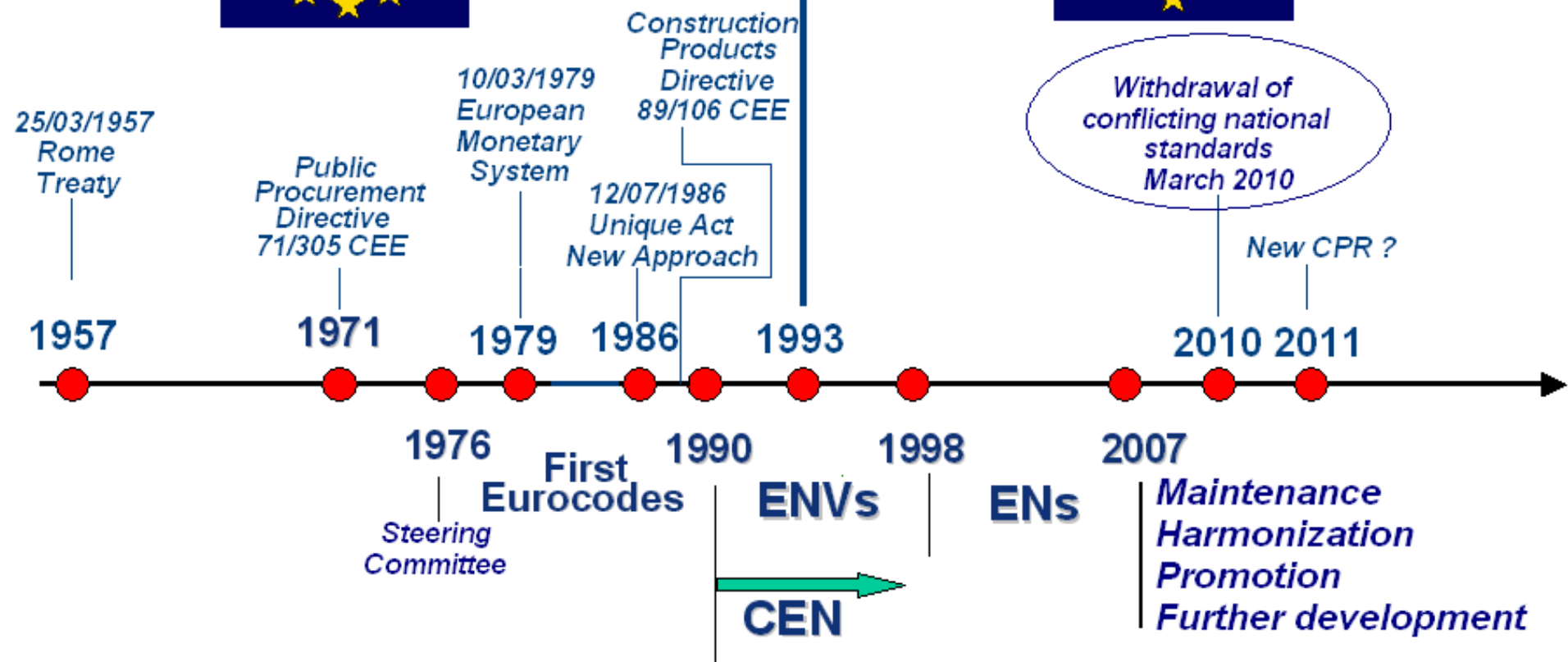


THE HISTORY OF THE EUROCODES

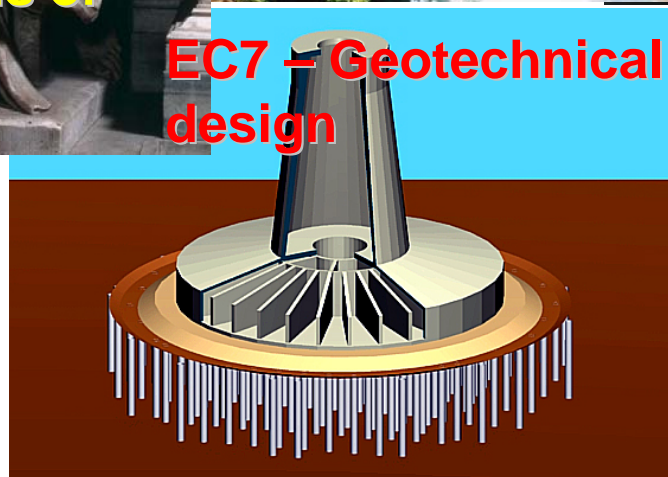
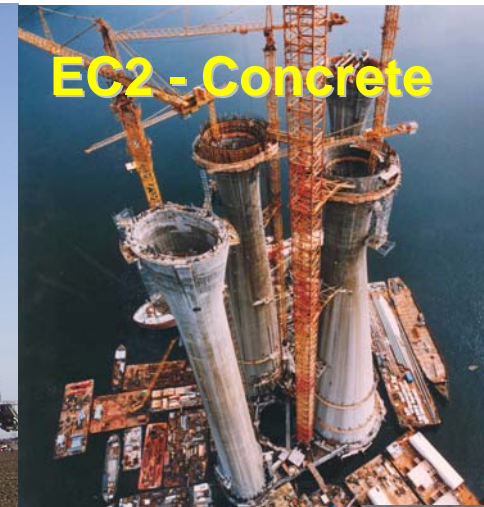
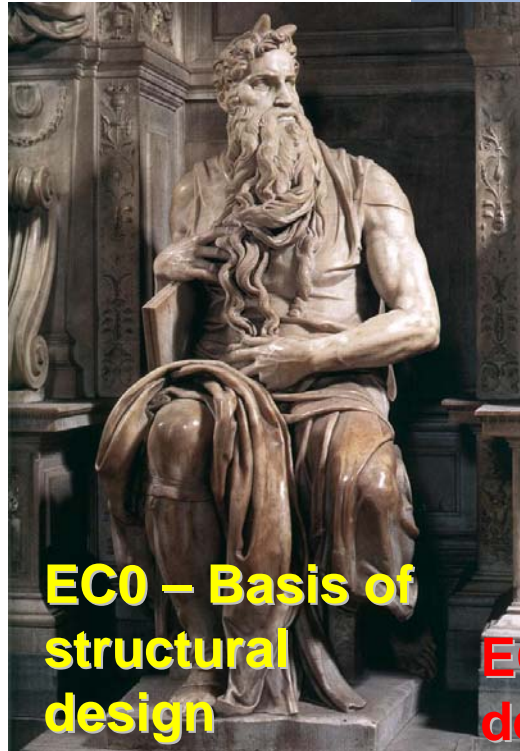




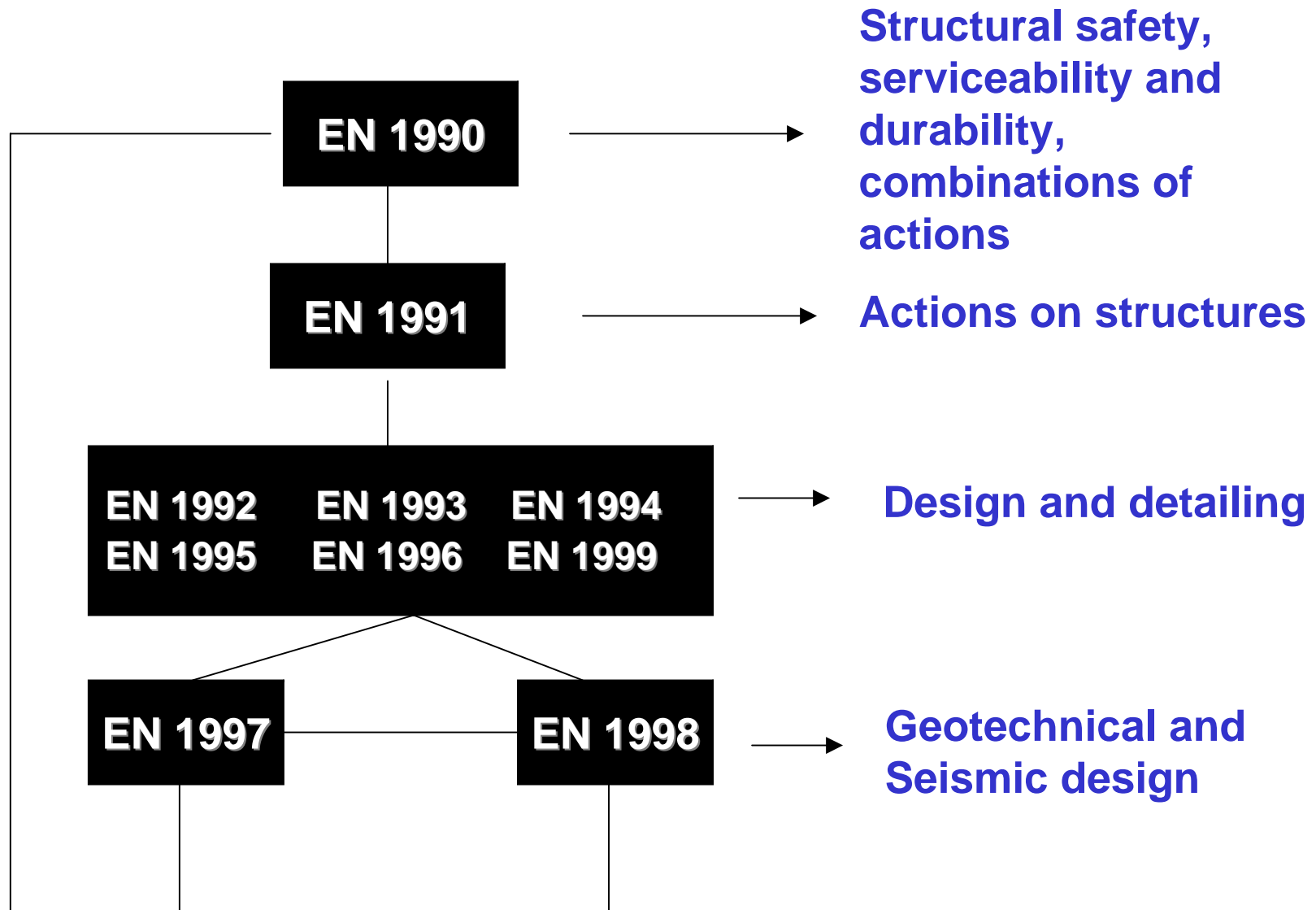
THE HISTORY OF THE EUROCODES

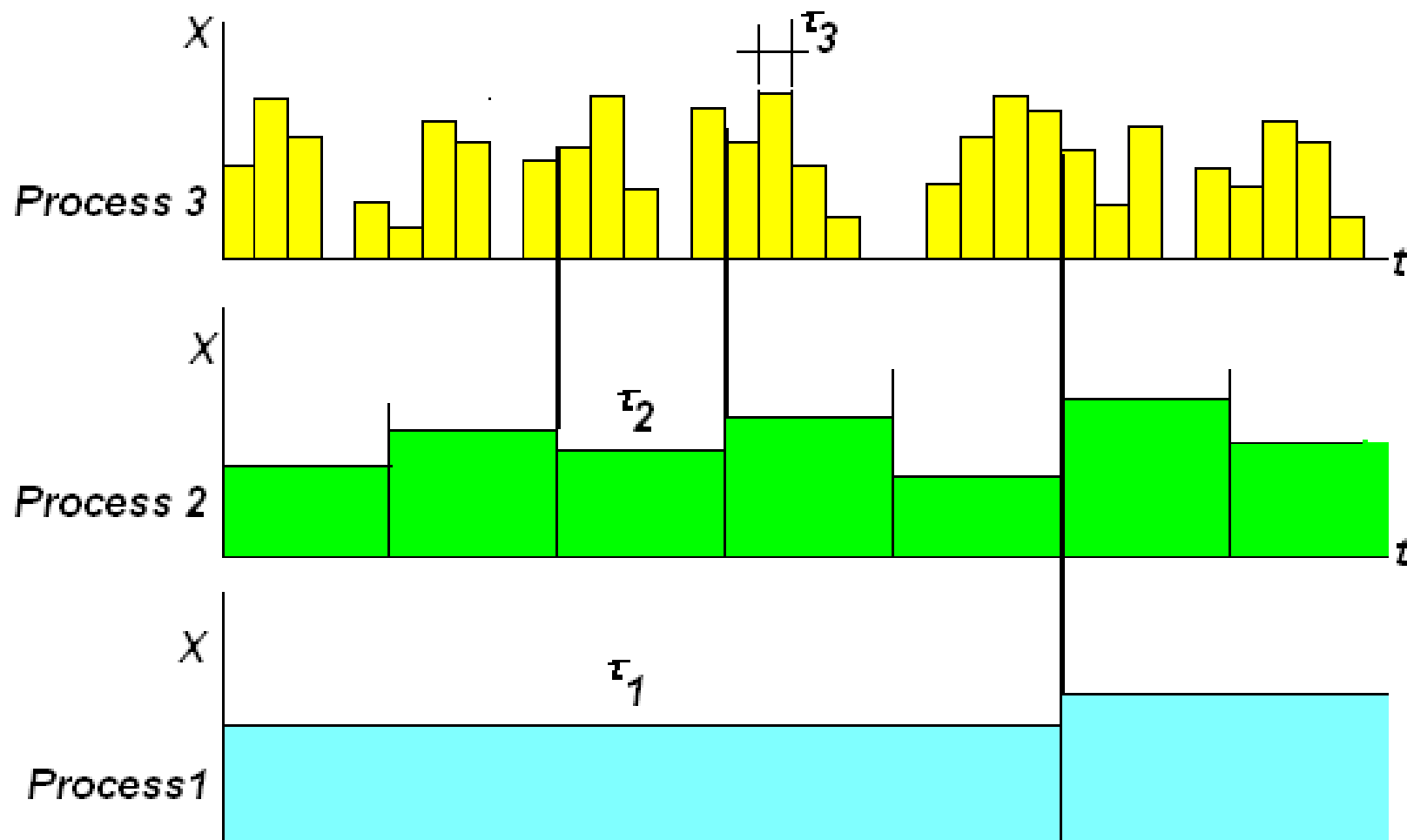


The Eurocodes family

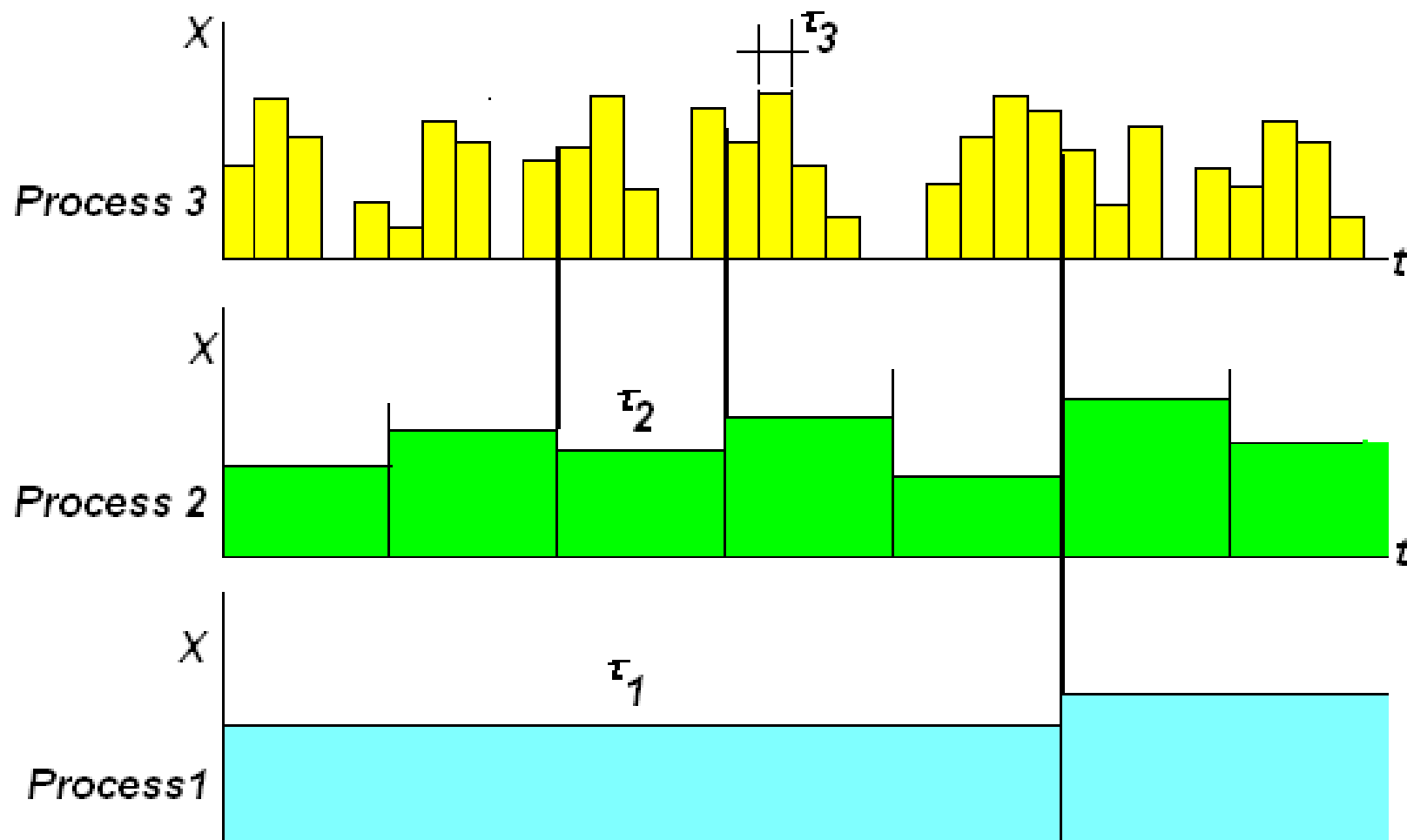


LINKS BETWEEN THE EUROCODES

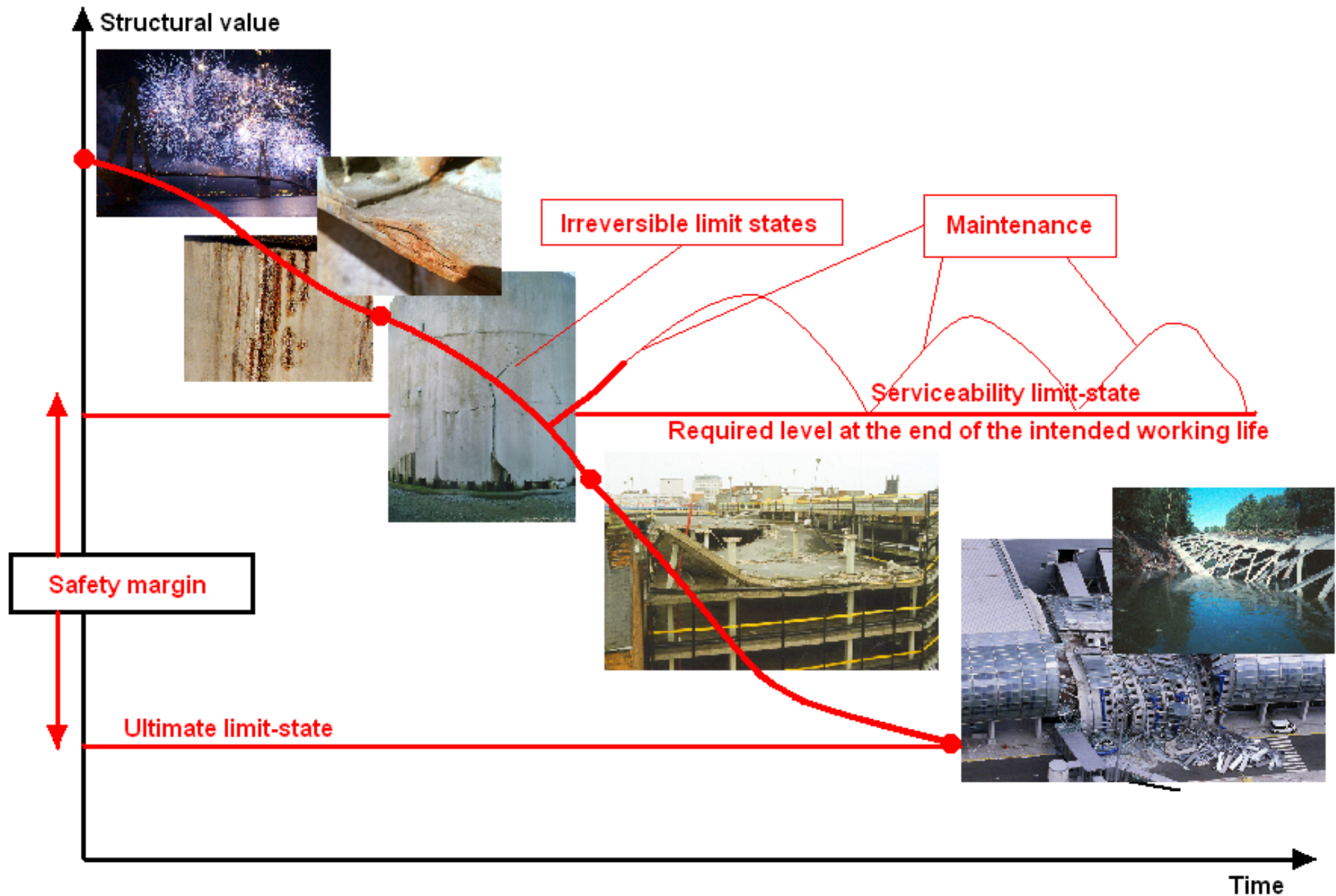




$$Y = \underset{T}{Max} \left\{ X_1 + \underset{\tau_1}{Max} \left(X_2 + \underset{\tau_2}{Max} X_3 \right) \right\}$$



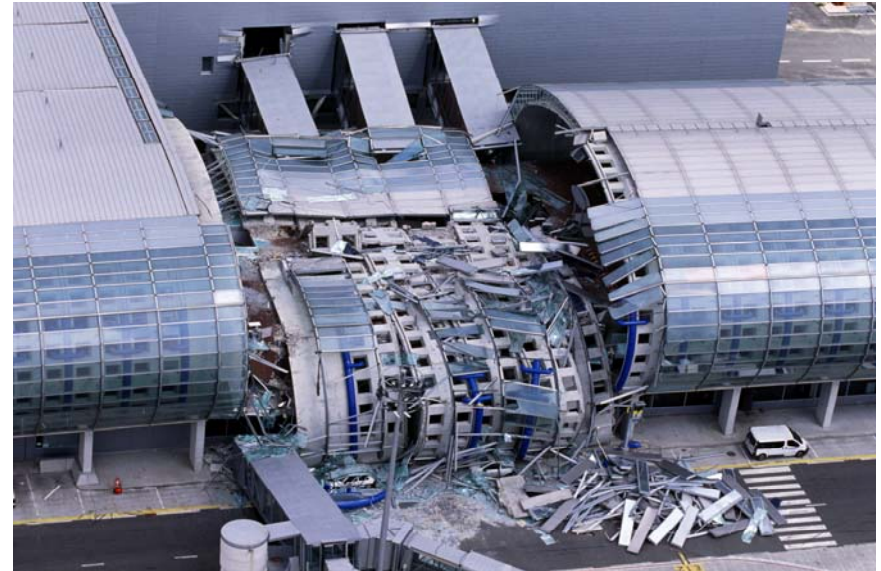
$$Y = \underset{T}{Max} \left\{ X_1 + \underset{\tau_1}{Max} \left(X_2 + \underset{\tau_2}{Max} X_3 \right) \right\}$$



The fundamental requirements in EN 1990 for the reliability of construction works include :

Structural safety: A structure shall be designed and executed in such a way that it will, during its intended life with appropriate degrees of reliability, and in an economic way sustain all actions likely to occur during execution and use. Safety of people, the structure and contents.

Serviceability: A structure shall be designed and executed in such a way that it will, during its intended life with appropriate degrees of reliability and in an economic way remain fit for the use for which it is required. Functioning, comfort and appearance of the structure





The fundamental requirements in EN 1990 for the reliability of construction works include :

Robustness: A structure shall be designed and executed in such a way that it will not be damaged by events such as

- Explosions

- Impact and

- Consequences of human errors

to an extent disproportionate to the original cause

Note: The events to be taken into account are those agreed for an individual project with the client and the relevant authority

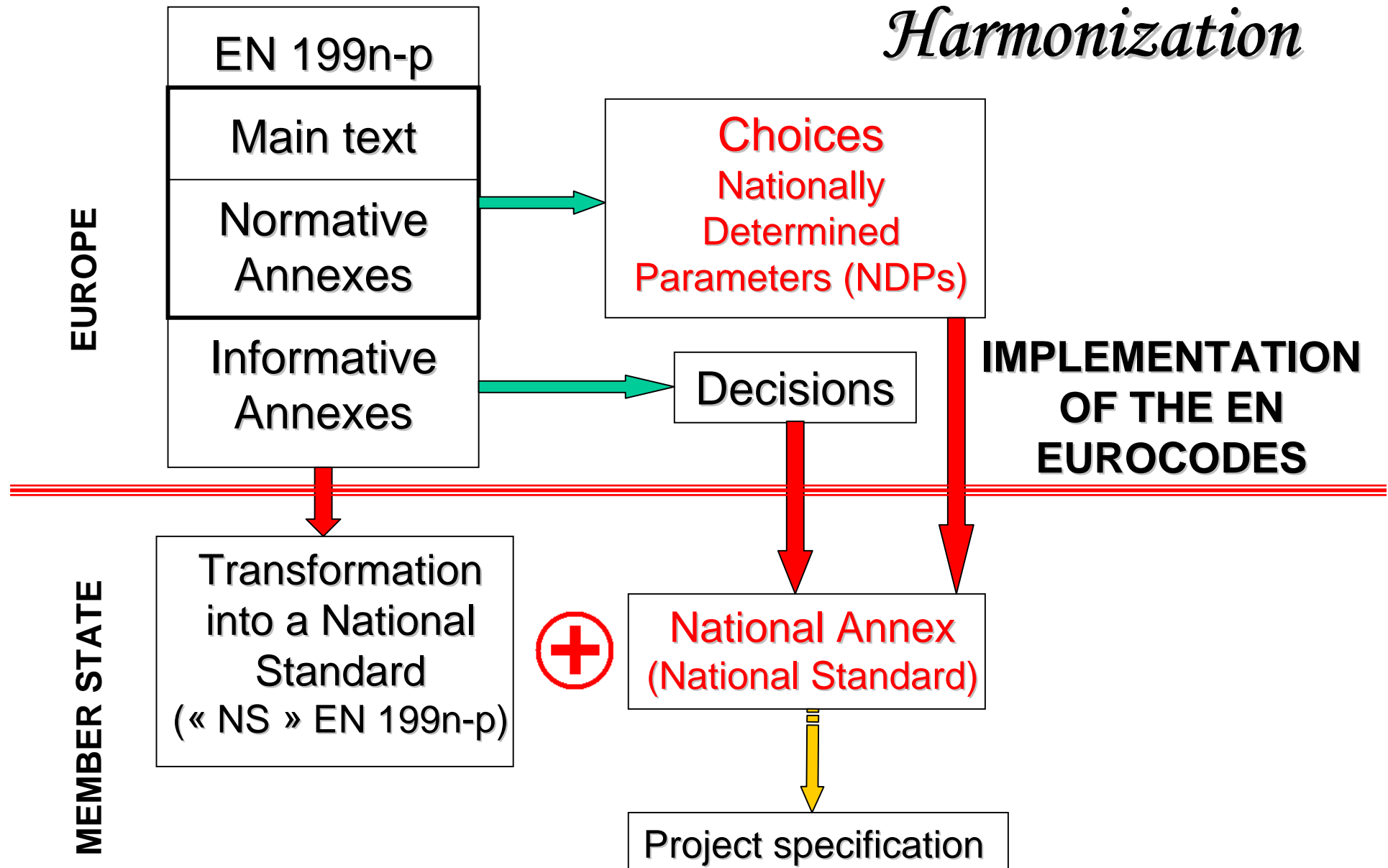


**The concept of
Robustness and the
protection of citizens**

PROMOTION AND ADOPTION OF THE EUROCODES OUTSIDE THE E.U.



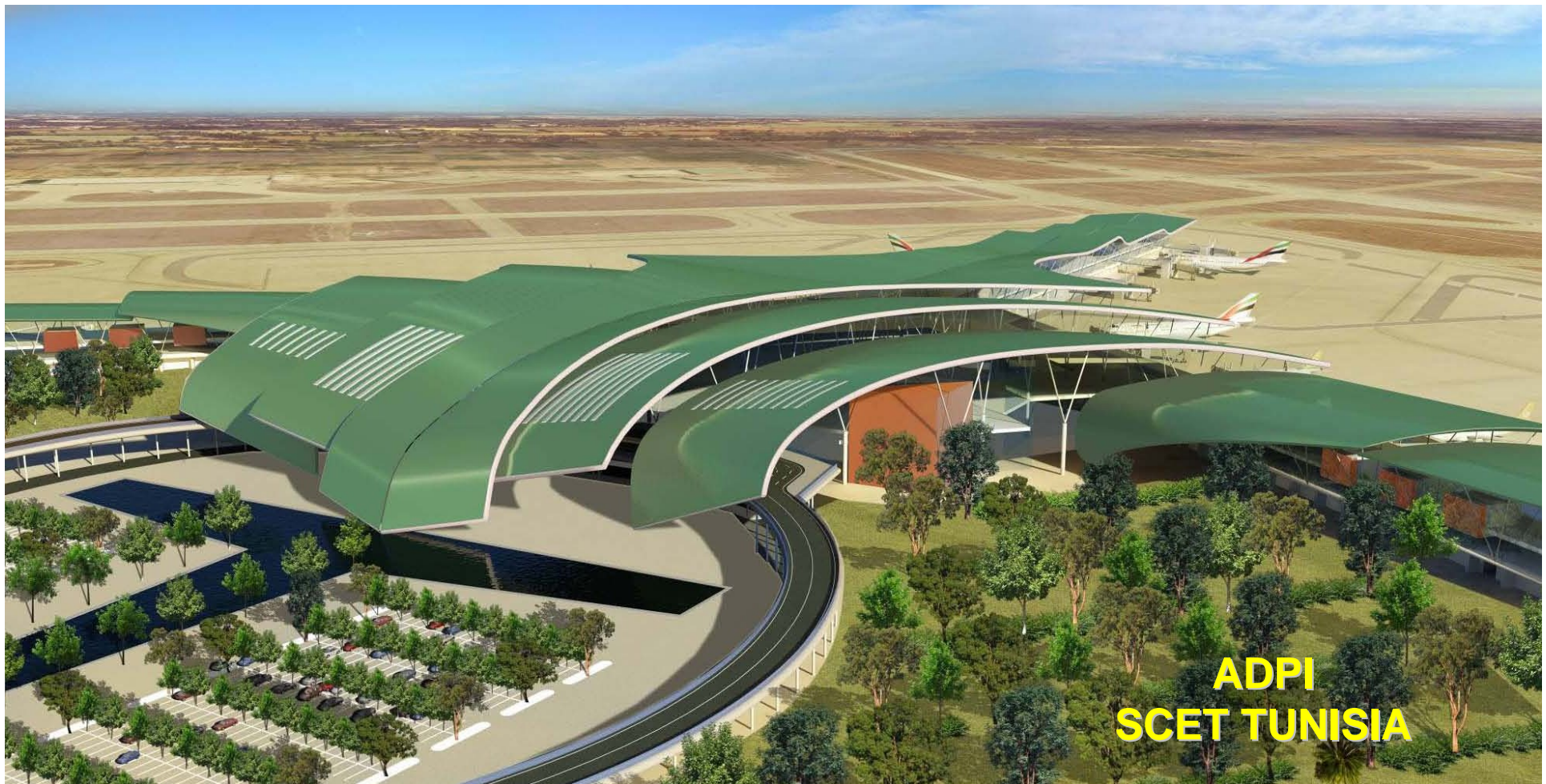
Harmonization



The Eurocodes

General overview – Principles, new developments and future challenges

**Tripoli (Libya) - Future International Airport – Passengers Terminal
(virtual view) – Design with Eurocodes 0, 1, 2 et 8**



**Future Tripoli Airport :
the construction site**



Liège (Belgium) – TGV Railway Station (Guillemins)



EUROCODES

A tool for building safety and reliability
enhancement

EU-Russia cooperation on
standardisation for construction

9-10 October 2008
President Hotel, Moscow

Programme



Organised by
Russian Federal Agency on Technical
Regulation and Metrology

with the support of
European Commission, CEN and
WASCS



Еврокоды

инструмент для повышения
безопасности и надежности зданий

Сотрудничество ЕС-Россия по
стандартизации в строительстве

9-10 октября 2008
Президент-Отель, Москва

ПРОГРАММА

Организована
Федеральным агентством по
техническому регулированию и
метрологии

с содействием
Европейской Комиссии, CEN и ВАНКБ



PROMOTION AND EDUCATION

中国 - 欧盟建筑标准和节能研讨 EU-China Conference on Standards and Energy Efficiency in Building

2008年1月29 - 30日, 北京
29 - 30 January 2008, Beijing

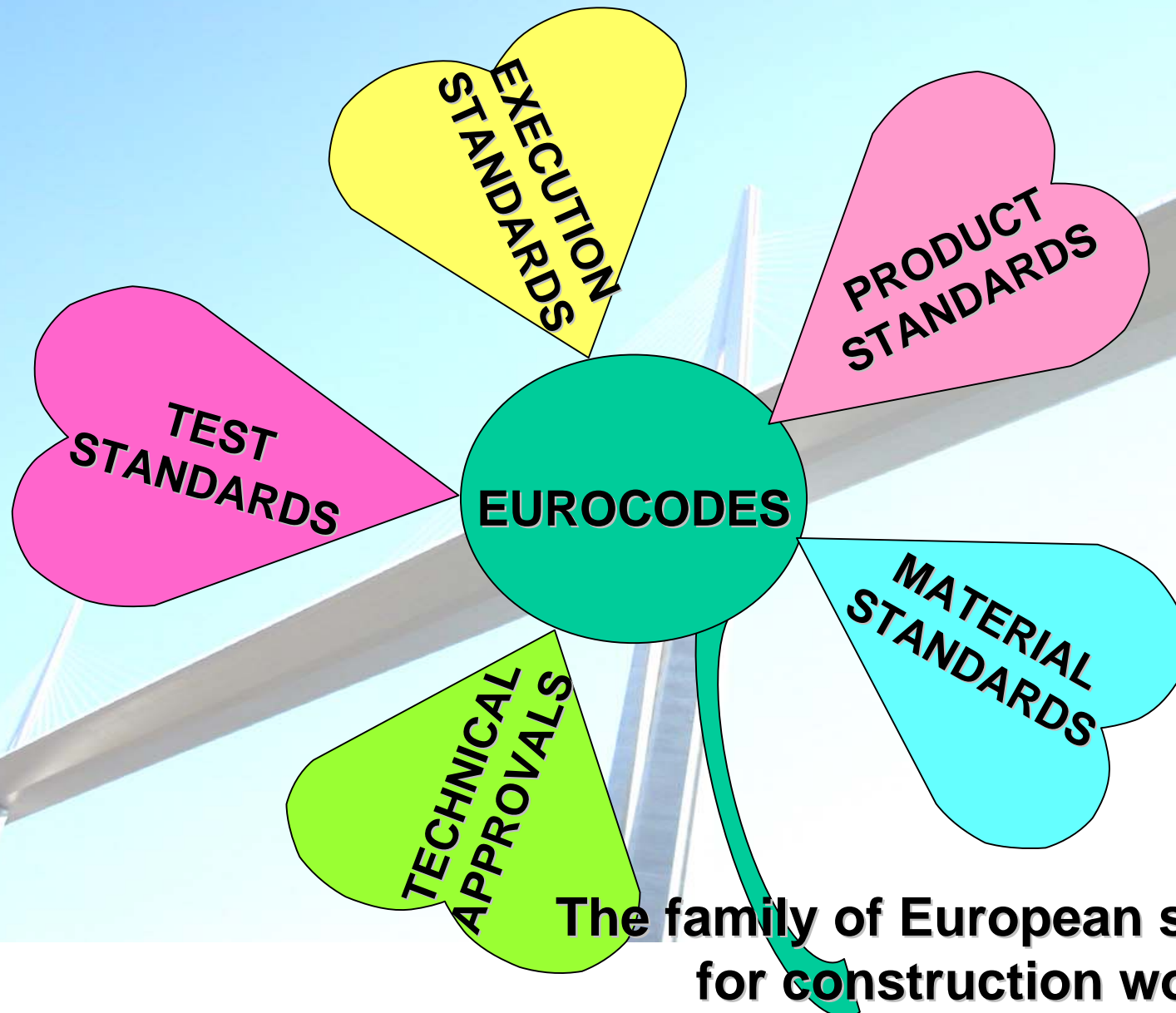
主办:
中华人民共和国建设部
欧盟企业与工业总局
欧盟交通与能源总局

Hosted by:
Ministry of Construction, P. R. China
EU Directorate-General for Enterprise and Industry
EU Directorate-General for Transport and Energy

承办:
中国欧盟经贸项目

Organised by:
EU-China Trade Project





**The family of European standards
for construction works**

THE FUTURE OF EUROCODES

- **New materials and/or techniques**
- **New concepts and/or requirements**
- **New societal needs**

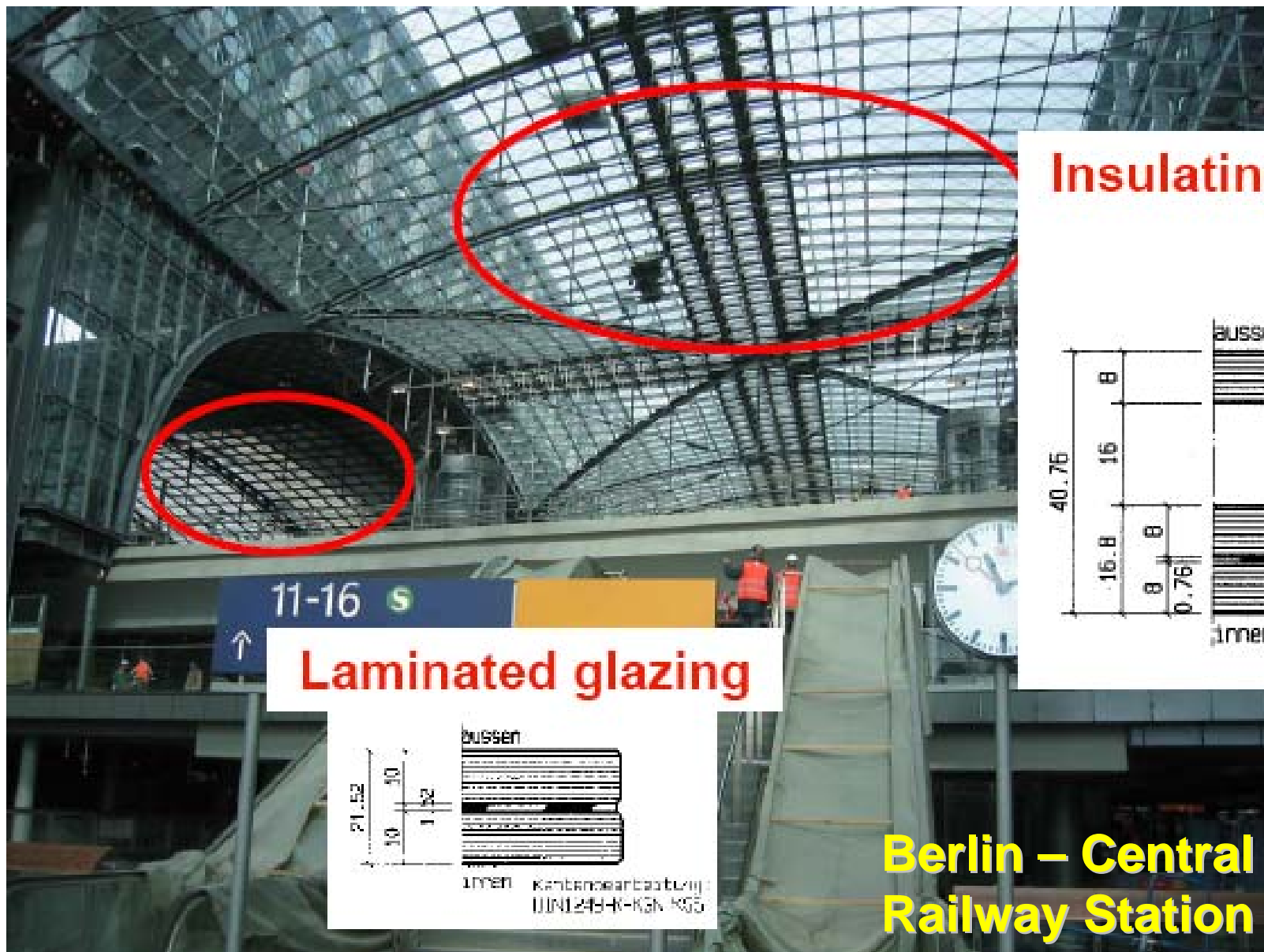
*New Materials and/or
Techniques*

Structural glass

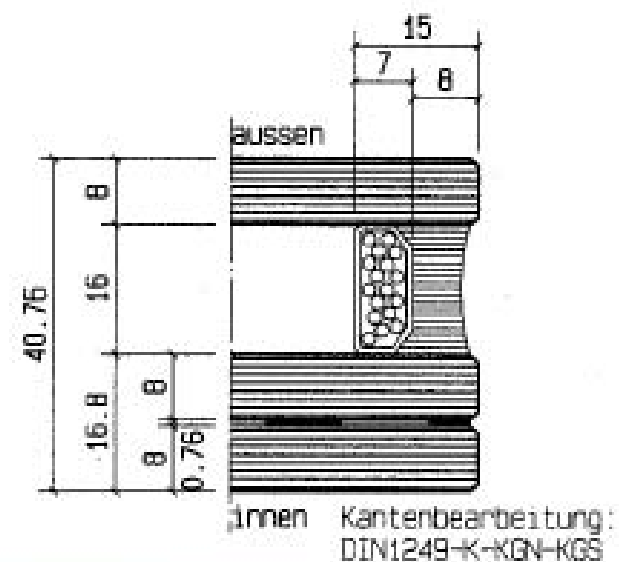




**Footbridge at Rotterdam –
Photo Ulrich Knaack**



Insulating glazing



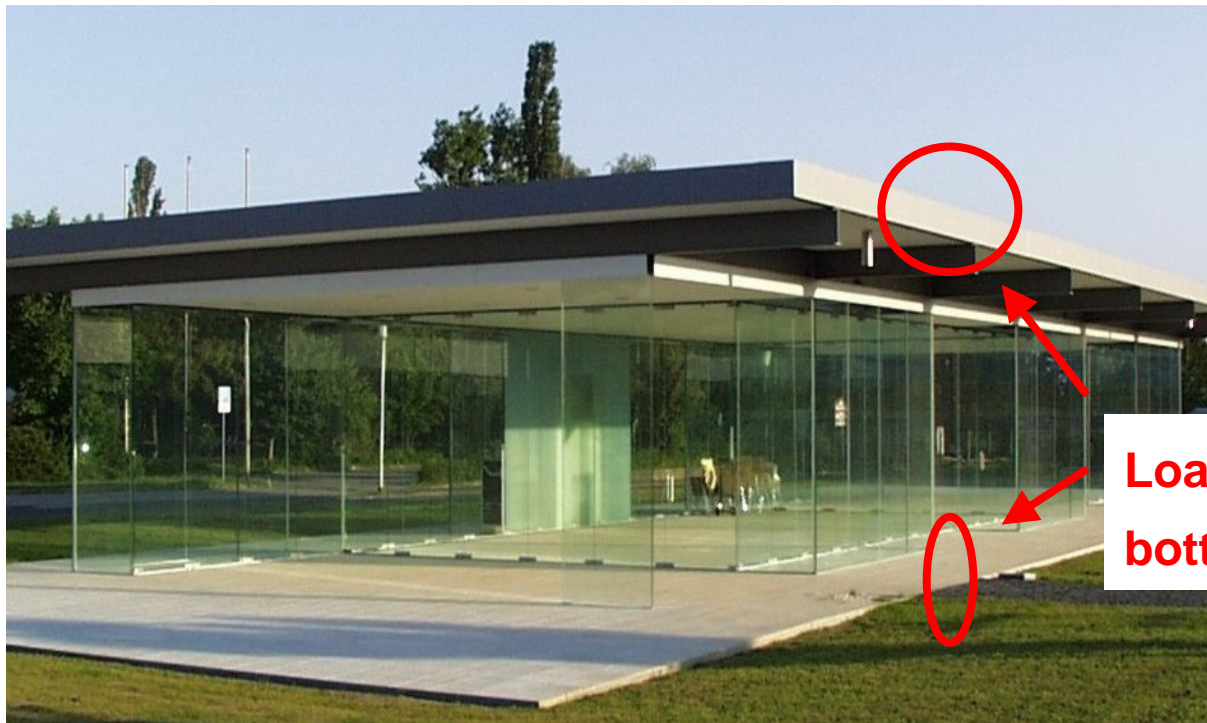
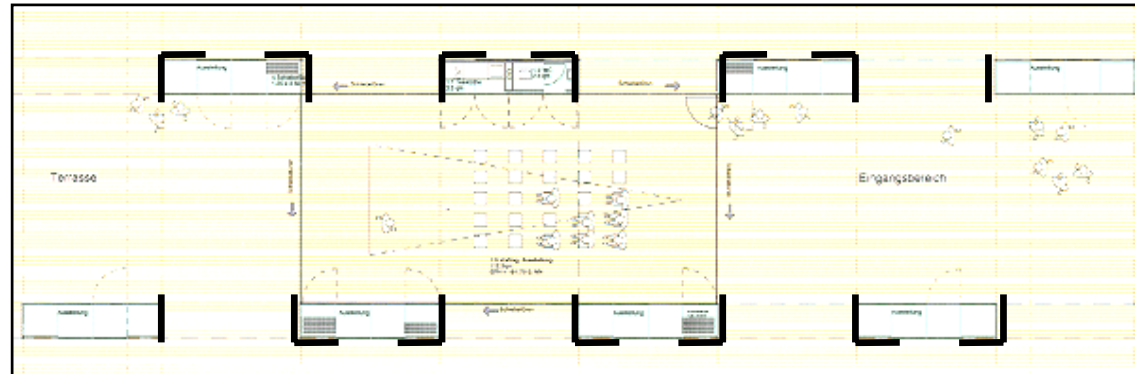
Laminated glazing



**Berlin – Central
Railway Station**

Glass Pavillon Rheinbach

Glass columns



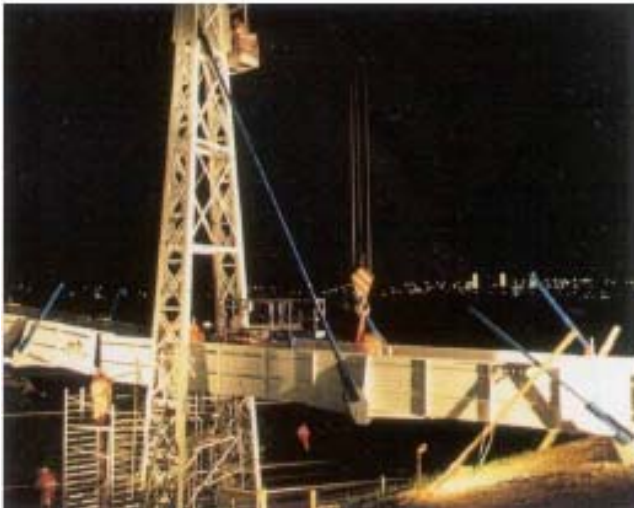
Load introduction at the top and bottom of the glass column

**Bridge in Spain – Carbon fibres
Fibre reinforced polymers**

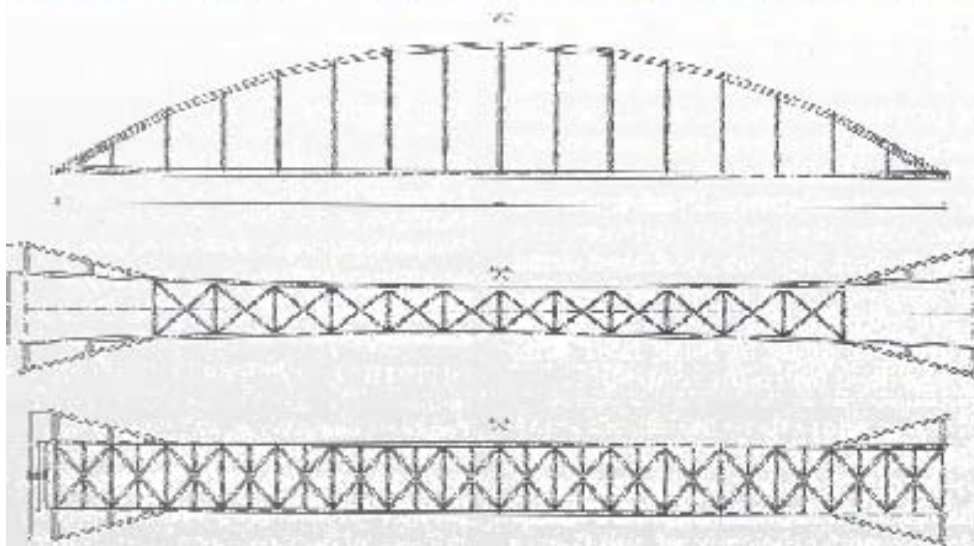


www.cnr.it/sitocnr/Englishversion

First FRP footbridge – Kolding, Denmark



FRP Bridge – Leida, Spain



Temporary bridge in Pontresina, Switzerland



copyright photo permission of Fiberline Composites A/S

*New Concepts and /or
techniques*

THE FUTURE CONSTRUCTION PRODUCTS REGULATION

ANNEX I

Basic works requirements

Construction works as a whole and in their separate parts must be fit for their intended use.

Subject to normal maintenance, basic works requirements must be satisfied for an economically reasonable working life.

The Eurocodes: past, present and future

Basic works requirements

- 1. Mechanical resistance and stability**
- 2. Safety in case of fire**
- 3. Hygiene, health and the environment**
- 4. Safety in use**
- 5. Protection against noise**
- 6. Energy economy and heat retention**
- 7. Sustainable use of natural resources**

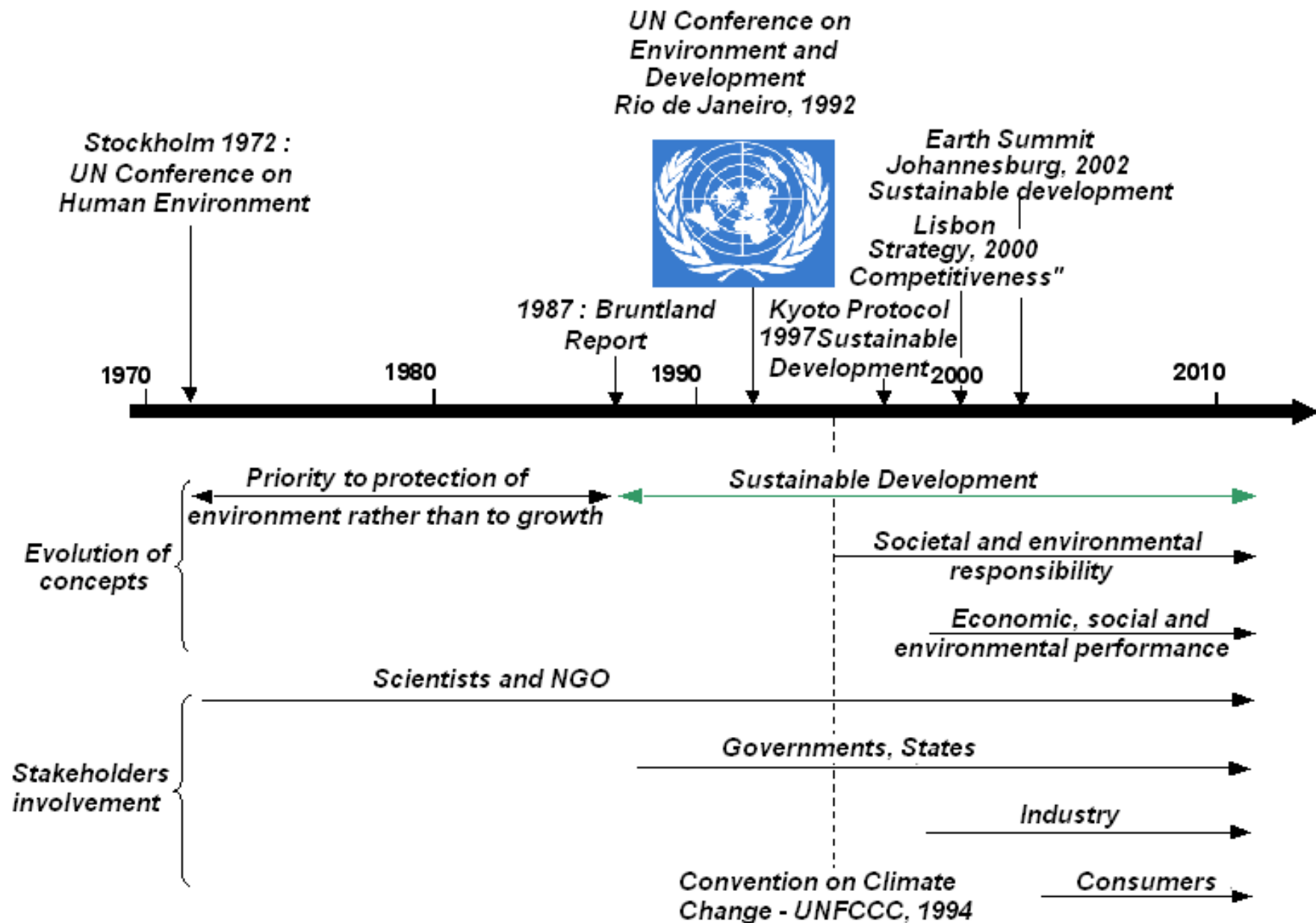
The Eurocodes: past, present and future

7. Sustainable use of natural resources

The construction works must be designed, built and demolished in such a way that the use of natural resources is sustainable and ensure the following:

- (a) recyclability of the construction works, their materials and parts after demolition;**
- (b) durability of the construction works;**
- (c) use of environmentally compatible raw and secondary materials in the construction works.**

Development of strategies for sustainability



Goals of the Lead market initiatives

Lead market initiative (LMI)

- **to promote favorable market conditions for new innovative products, services and technologies in the EU market**
- **to achieve improved competitiveness for the European Union**
- **to provide solutions to economic and societal challenges such as health, energy, environment and transport.**

6 Lead market initiatives

- **e-Health**
- **protective textiles**
- **sustainable construction**
- **recycling**
- **bio-based products and**
- **renewable energies.**



CEN-actions supporting the lead Market Initiative

Proposed actions for standardisation (LMI)

- **Define a framework, assessment method and benchmarks for assessing the sustainability performance of buildings and of the construction**
- **Expand the scope of Eurocodes in order to integrate other sustainability aspects in construction design, such as energy and environmental aspects.**

Concept for sustainability assessment

Basic work requirements	Essential (basic) requirements						
	1	2	3	4	5	6	6+1
	mechanical resistance and stability	resistance to fire	hygiene, health, environment	safety in use	protection against noise	energy economy heat retention	sustainable use of natural resources
CEN/TC 250 + CEN/TC's for products	Eurocodes			EC's			
	Product standards			PS's			
CEN/TC 127		Fire safety					
CEN/TC 126					Acoustics		
CEN/TC 89 CEN/TC 228 CEN/TC 156 CEN/TC 88 CEN/TC 113						Design methods, Products	
BT/PC 371						Energy performance	
CEN/TC 350 CEN/TC 351							Sustainability
							Indicators

Market growth drivers for sustainable construction

- **The factor time will get more and more importance for real estates.**
- **In view of growing prices for energy, the question is until when the building will be competitive?**
- **How can by design a building be made adaptibel for fully new energy-innovations in the future?**
- **How can vacancies be prevented, that result from no more meeting the home requirements of an aging or more flexible society?**
- **How can demolition and substitution of a building be performed ?**

Market growth drivers for sustainable construction

- **The rating of the financial risks of real estates will include a premium or a discount for the sustainability of buildings.**
- **To this end a certification of the energy-efficiency and of the sustainability of services and products is necessary that brings together the responsibility of Member States and the economic competence and competitiveness of industry.**

Market growth drivers for sustainable construction

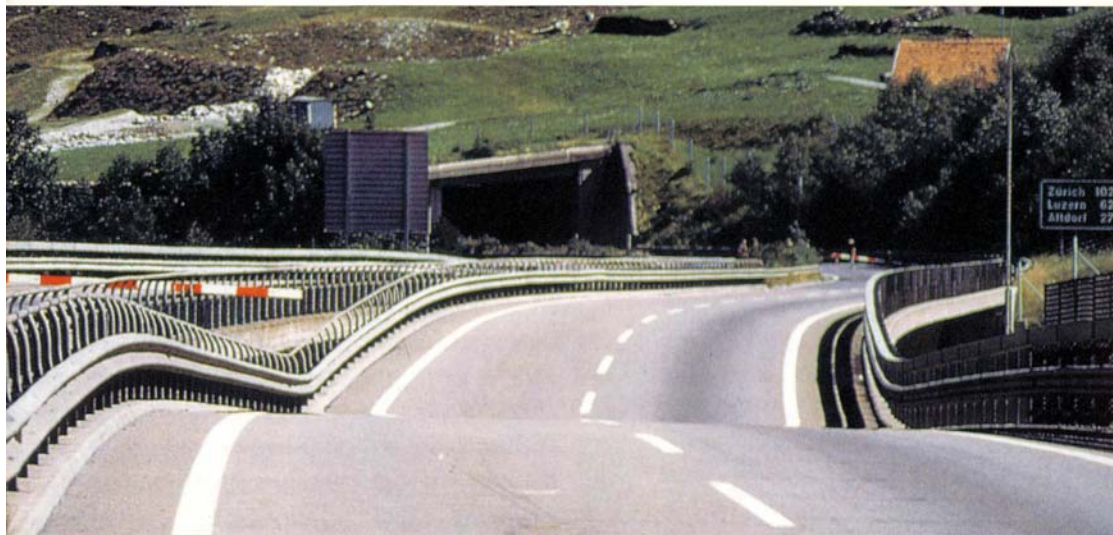
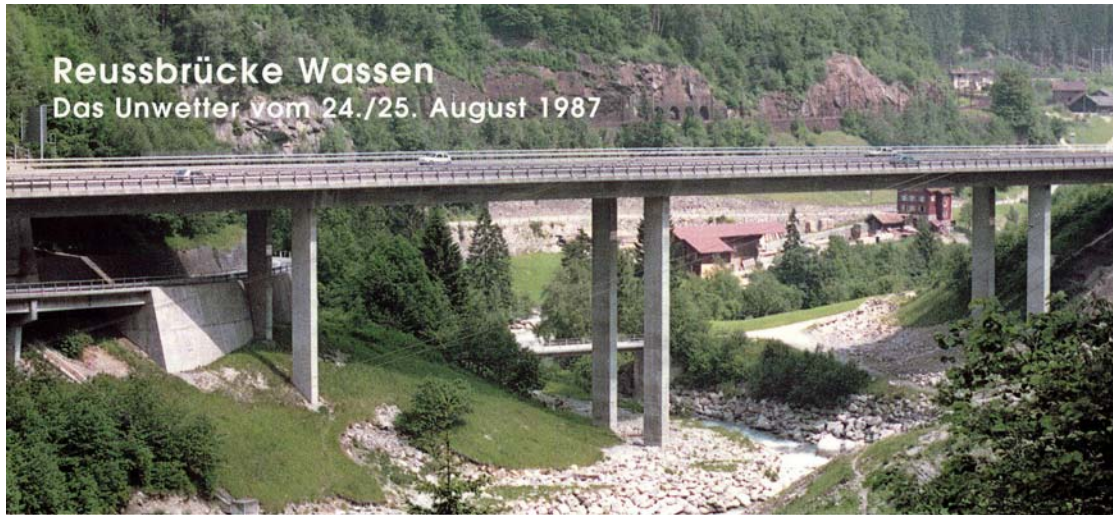
- **New instruments are required for the cooperation of governments and industry, to promote sustainable construction:**
 - **Sustainability strategy for town planning and for civil engineering works, e.g. to turn a town from an energy consumer to an energy producer.**
 - **Need for adequate coherent and consistent codes as platform for communication that give indicators and methods for calculation. These codes must support “system solutions” that result from “integral design”.**
 - **A certification shall extend the business field and make it more demanding and pretentious. Sustainability is a goal to make money with durable success including ecological, economic and socio-cultural goals.**

Pollution in the World



New Societal Needs

Assessment of existing structures





Principle 1

Veracity and completeness of information.

Principle 2

Lessons from experience

Principle 3

Improving knowledge

Principle 4

Utility optimisation and intangibles

Principle 5

Ecological values and future of mankind



Principle 1

Veracity and completeness of information.

Principle 2

Lessons from experience

Principle 3

Improving knowledge

Principle 4

Utility optimisation and intangibles

Principle 5

Ecological values and future of mankind

Albrecht Dürer, 1506



*Thank you for
your attention*

