fib Model Code 2020
for concrete structures:
Existing structures - Assessment, through-life management & interventions

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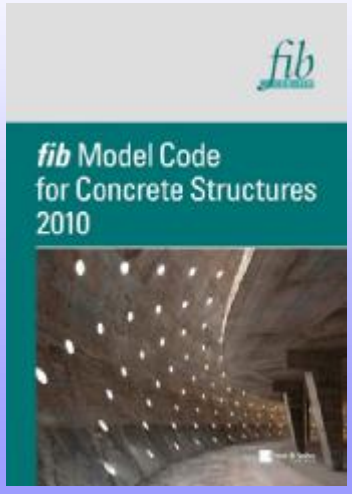
BE2018, LNEC, Lisbon, 7-9 Nov 2018

The *fib* Model Code

Fédération internationale du béton

International Federation for Structural Concrete

- **An advanced guideline for the design of concrete structures**
- **Summarises considered up-to-date knowledge, not only mature consensus material as legal codes mostly do**
- **A premier design guideline worldwide**
- **Is *fib's* flagship publication**



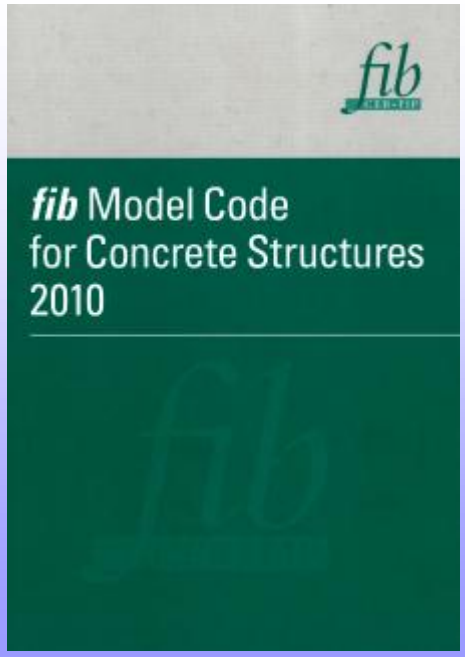
MC2010 - Achievements include

- Introduction of a life cycle approach / sustainability principles
- Conceptual design included to recognise importance of 'creativity'
- Service life design of structures
- Diverse range of loading types (static, fatigue, impact, explosion, seismic, fire, cryogenic)
- Improved safety formats applicable to new and existing structures
- Improved constitutive relations for concrete, inc. durability aspects
- Steel fibres & non-metallic reinforcement as alternatives to RC
- Scientifically based models, with levels of approximation
- Introduction of reliability concepts in numerical analysis
- **Introduction of maintenance strategies for through-life care for new and existing concrete structures**

fib Model Code 2010

New & existing structures

Matters concerned with existing structures mainly addressed in *Chapter 9: Conservation*



fib Model Code 2010 - Overview

Conservation of existing structures
- Response to design provisions for a new structure
- Gives Principles, but not all necessary technical details

PART	CHAPTER
Part 1	1. Scope
	2. Terminology
	3. Basic principles
Part II: Design Input Data	4. Design principles
	5. Materials
	6. Interface characteristics
Part III: Design	7. Design
Part IV: Construction	8. Construction
Part V: Conservation	9. Conservation
	10. Dismantlement

fib Model Code 2010: Chapter 9: *Conservation of Concrete Structures*

9.1 General

9.2 Conservation strategies and tactics

9.3 Conservation management

9.4 Condition survey

9.5 Condition assessment

9.6 Condition evaluation and decision-making

9.7 Interventions

9.8 Recording

Principles defined, but further technical details necessary for assessment and through-life care / interventions for the range of situations encountered with existing structures

Development of the *fib* Model Code and its influence on other standards

ENV for EC2

EC2:2004

EC2:2020 ?

Asian & African Model Codes ?

1978 1990 2010

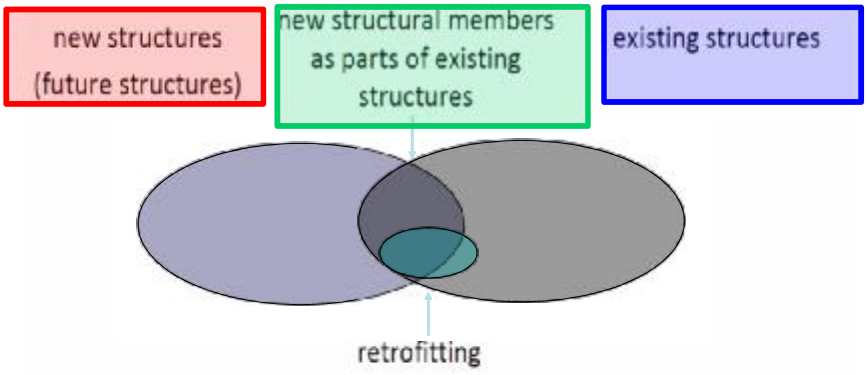
***fib* Model Codes are reference documents used worldwide for research and structural design**

The *fib* Model Code will become .....

- **An advanced guideline for the design and assessment of new & existing concrete structures**
- **Summarises up-to-date knowledge, not only mature consensus material as legal codes mostly do**
- **The premier structural design and assessment guideline worldwide**
- **Is *fib*'s flagship publication**

An ambitious aspiration

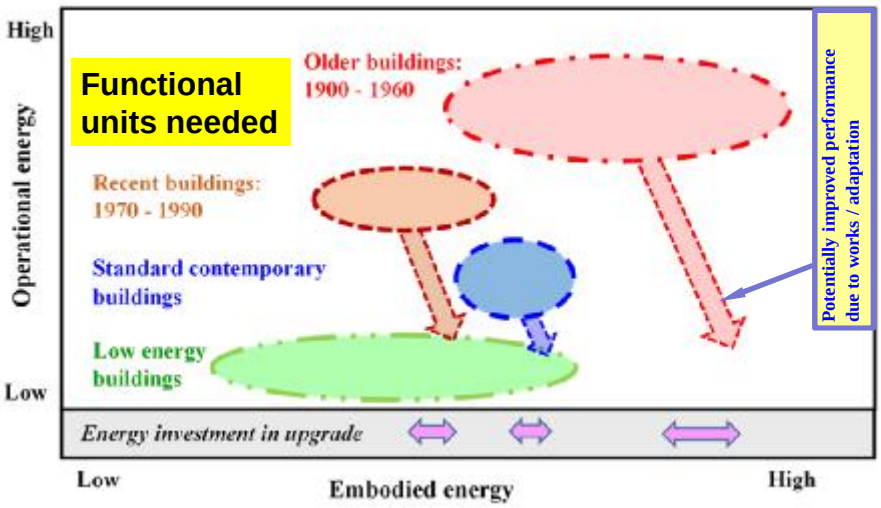
MC2020 - Conceptual Scope:
New, existing and altered / adapted structures



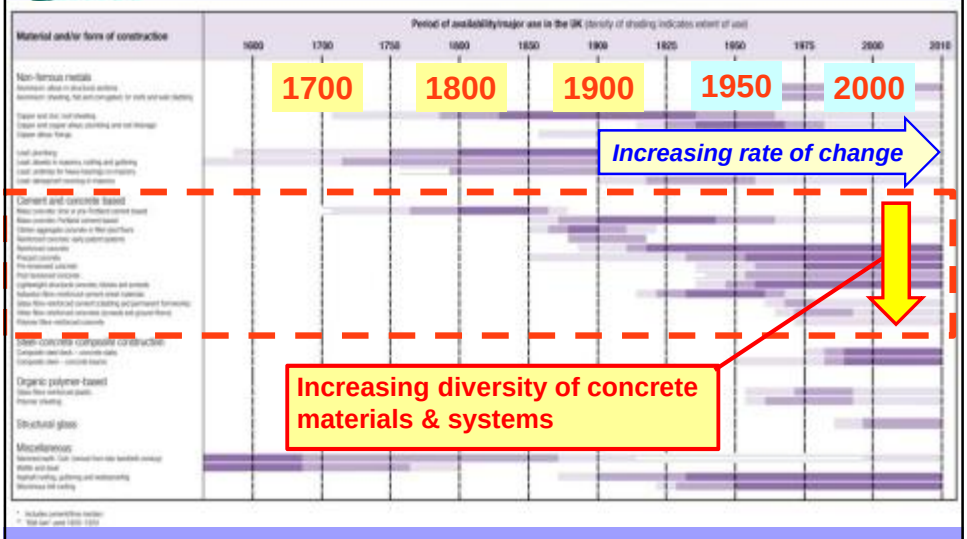
New structures and existing structures are not always easy to distinguish (overlap region is very important for engineer's activity)

Strong driver is enhanced energy performance of upgraded and adapted buildings:

Improved durability, functionality, etc



Challenges for MC2020: Materials / forms of construction



Inst. Structural Engineers: Appraisal of existing structures: 3rd edition

Concrete – An extended family of materials

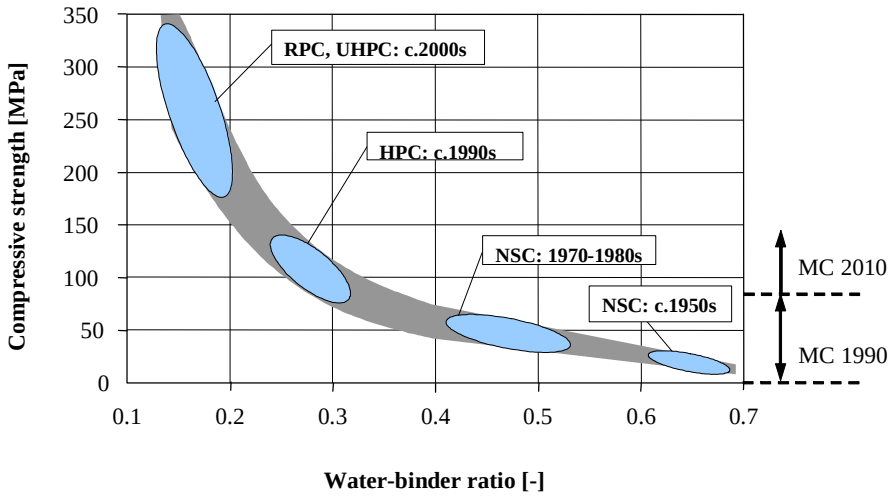
Very different properties, characteristics & performances

- Compressive strength - 2 MPa to over 200 MPa
- High strength concretes
- High performance concretes
- Lightweight concretes
- Gas concretes
- High density concretes
- Flowable and self-compacting concretes
- Coloured concretes
- Concretes made with recycled and / or waste materials
- Fibre reinforced concretes: metallic & non-metallic fibres
- Concretes using corrosion resistant metallic reinforcement
- Concretes using non-metallic reinforcement ……. etc

Concretes used in previous generations of structures

Concretes using new binders

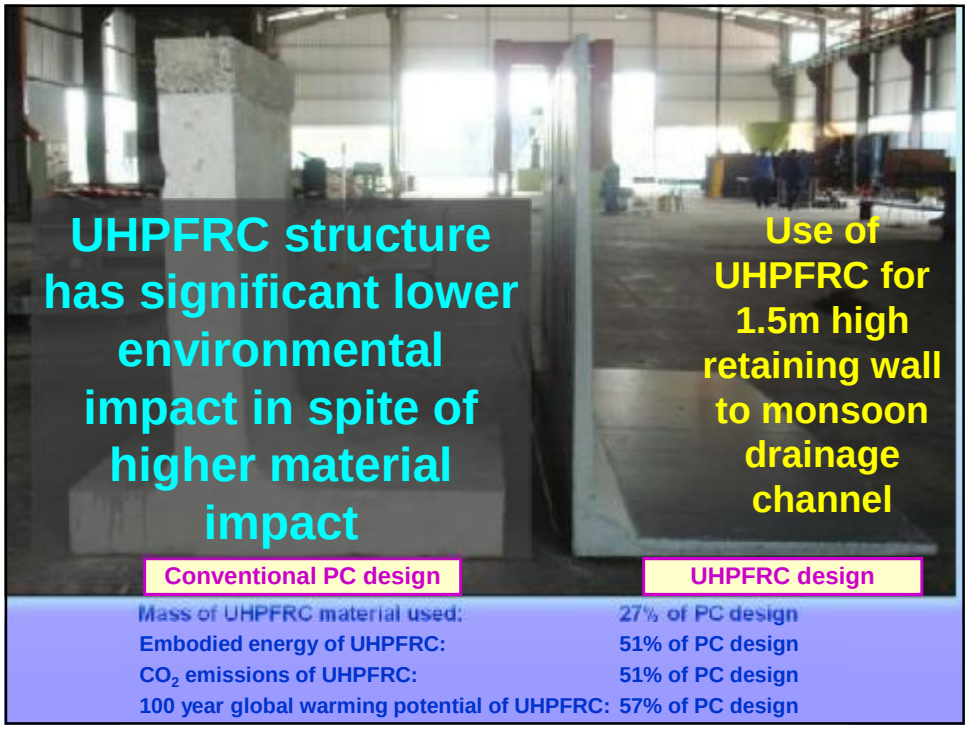
New repair & protection materials



Change in concrete compressive strength since ≈1950

[Expressed in terms of f_{cm}, the mean value of concrete cylinder compressive strength]:
Courtesy: Harald Mueller


Toll plaza Millau Viaduct, France
Sakata Mirai pedestrian bridge, Japan
Structures built using ultra high performance fibre reinforced concrete (UHPFRC)


UHPFRC structure has significant lower environmental impact in spite of higher material impact
Use of UHPFRC for 1.5m high retaining wall to monsoon drainage channel
Conventional PC design
UHPFRC design
Mass of UHPFRC material used: 27% of PC design
Embodied energy of UHPFRC: 51% of PC design
CO_2 emissions of UHPFRC: 51% of PC design
100 year global warming potential of UHPFRC: 57% of PC design

Concrete – Known for its longevity

- Pantheon, Rome built circa 126 BC and still remains in service
- Originally a Roman temple
- Now a working church

Most concrete structures perform well and are adequately durable for their service environment and have satisfactorily long service lives

Some in extremely harsh or demanding service environments…


North Sea Oil Platforms: Oseberg A


An extended family of concrete structures …
Great Belt East Bridge, Denmark
Main span of 1624 m
100 year service life design
Service life for some infrastructure can be very long – Netherlands Delta Scheme 200 years !!

An extended family of concrete structures constructed from a diverse range of concrete materials…

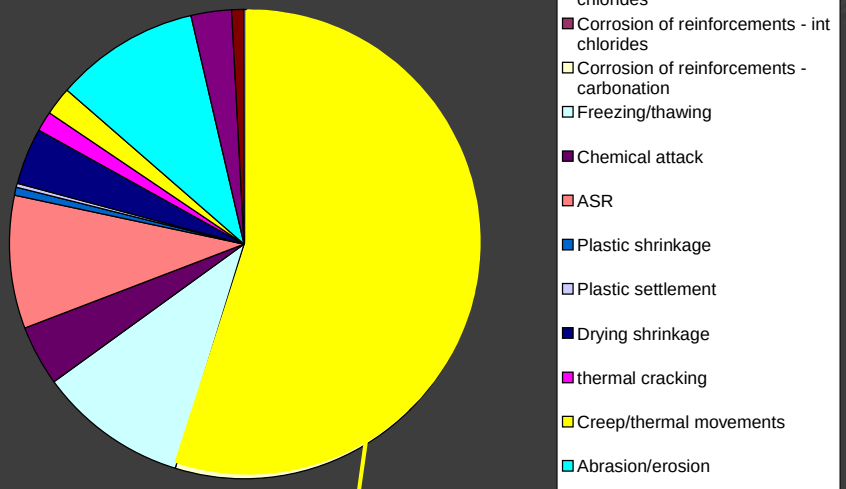
Some structures deteriorate or are damaged in-service and need to be assessed for current safety and future performance / durability

Type of structure	Corrosion of steel		Deterioration of concrete			Physical damage		
	CO_2-induced	Chloride induced	Freeze / thaw	External chemicals	Internal reactions	Impact / Abrasion	Fire	Seismic
Above ground buildings [3]	C			S	S		S	S
Industrial floors [4]				C		C		
Tunnels	C	S	In Artic latitudes	S	S		S	S
Concrete chimneys	C		S	C	S			S
Sewage plants	C	C		C	S			S
Bridges	S	C			S	S		S
Car parks	S	C	S	S	S	S	S	S
Swimming pools	S	S		S	S			S
Coast marine structures	S	C			S	S		S
Dams (unreinforced)			C		C	Erosion		S
Foundations				C	S			S
Tanks and pipes	S			C	S			S

Accidental actions

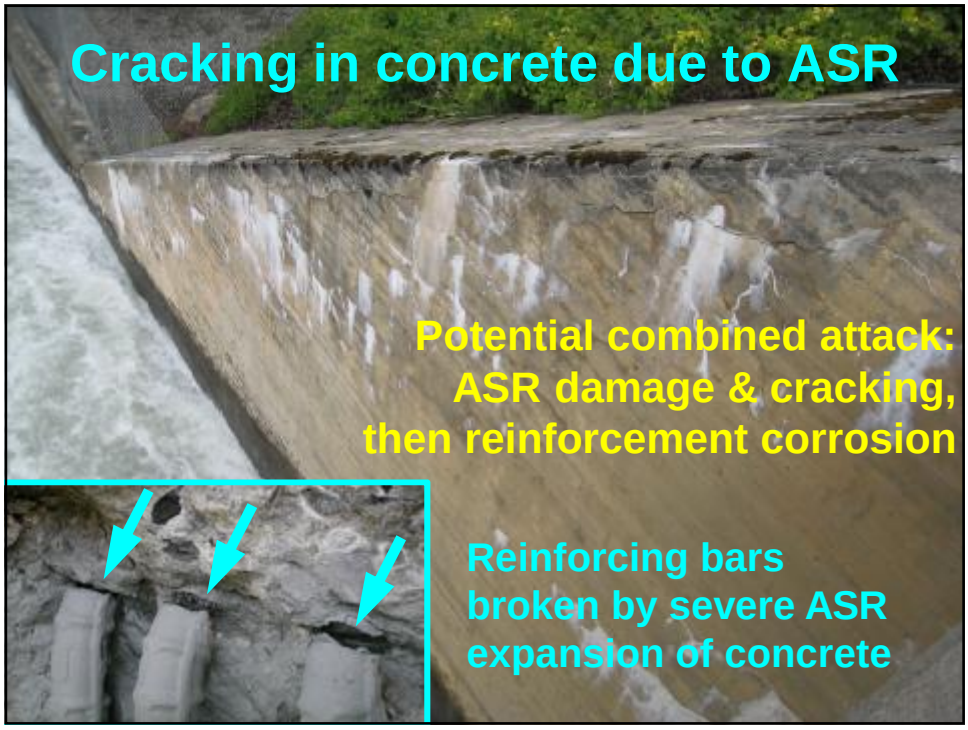
Key: C = Common | S = Sometimes | Infrequently

Deterioration processes affecting concrete: Jones et al [1997]



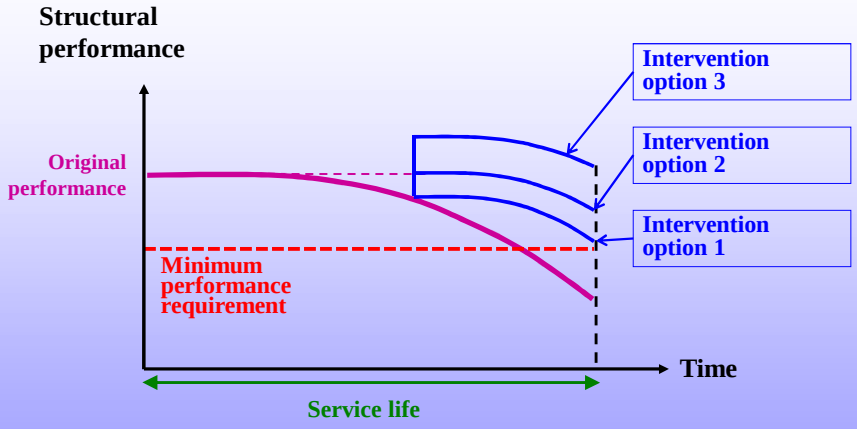
Reinforcement corrosion

Carbonation induced reinforcement corrosion


Cracking in concrete due to ASR
Potential combined attack:
ASR damage & cracking,
then reinforcement corrosion
Reinforcing bars
broken by severe ASR
expansion of concrete


Accidental damage:
Impact
Immediate implications for structural safety
Potential durability implications !!

Intervention options providing different levels of functionality / life

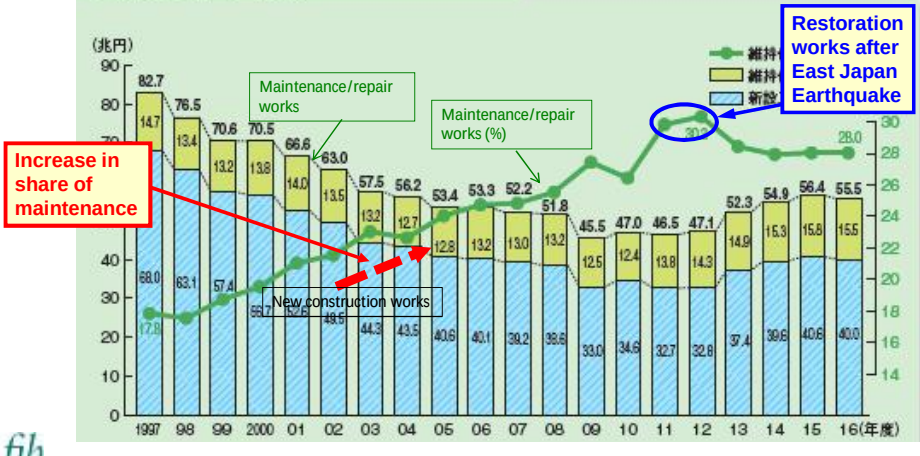


Note:
Option 1: Reduce the deterioration rate only
Option 2: Restore the performance and reduce the deterioration rate
Option 3: Upgrade the performance and reduce the deterioration rate

Maintenance and Repair Works in Japan

Percentage of maintenance and repair works is steadily increasing. Increase will continue in future.

Ref: Kenstsu-gyo Handbook (2018)



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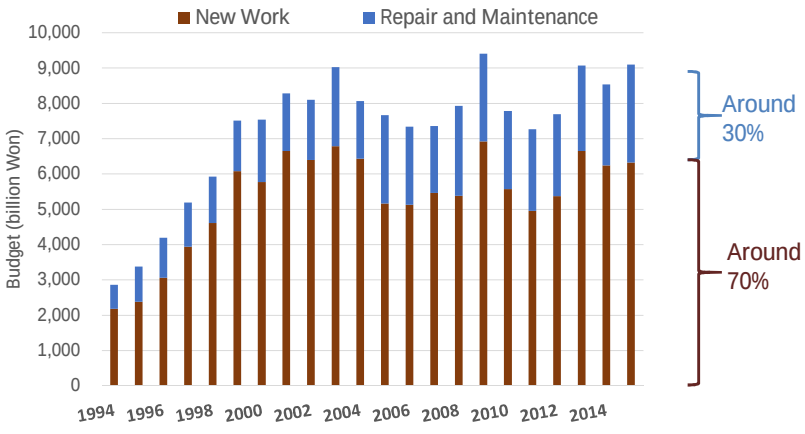
Maintenance and Repair Works in S. Korea

30% for maintenance/repair in South Korea (Roads only)



Ref: Yearbook of Road Statistics (2016), Statistical Year Book of MOLIT (2016)

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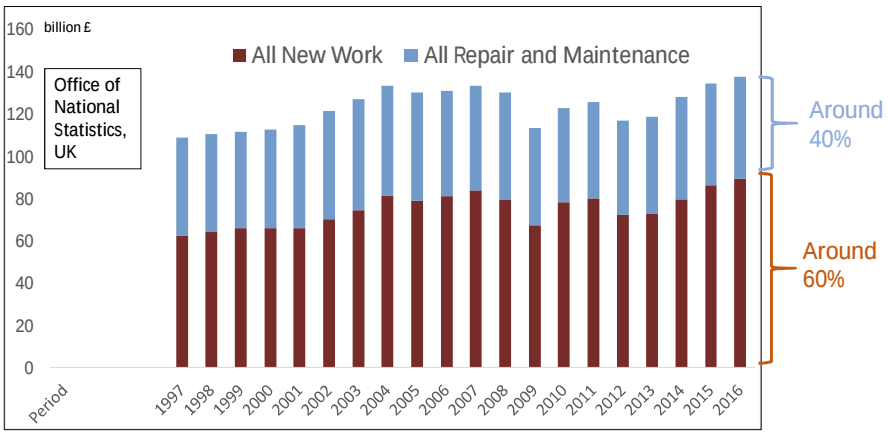
Maintenance and Repair Works in UK

- 40% for maintenance/repair in UK (in billion pounds)
- In Japan less than 30% and in Korea around 30% for maintenance/repair **à** expected to increase up to 40%



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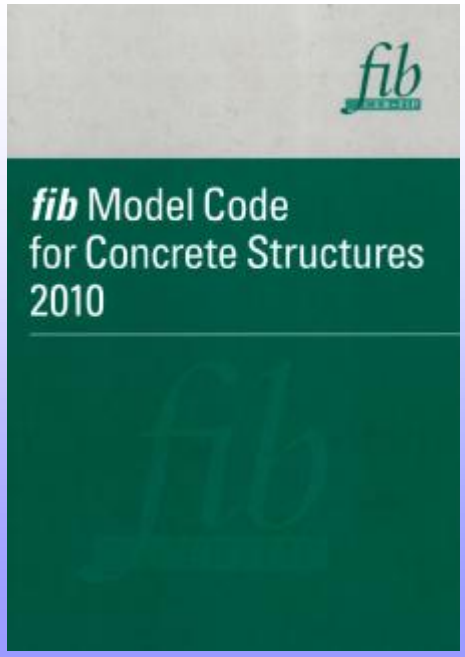
Conservation of concrete structures – Why should we be concerned about this?

- To ensure satisfactory through-life performance (functionality) of structure:
  - Safety of structure and users
  - Serviceability of structure
  - Maintenance / replacement works envisaged during design
  - Preserve satisfactory aesthetic appearance of structure
- Minimise through-life cost and environmental impacts
- Achieve the intended design service-life of structure
- Facilitate an extension of life / change of use of structure
- Significant sustainability benefits from extension of life

fib MC2020

The starting point is *fib* Model Code 2010

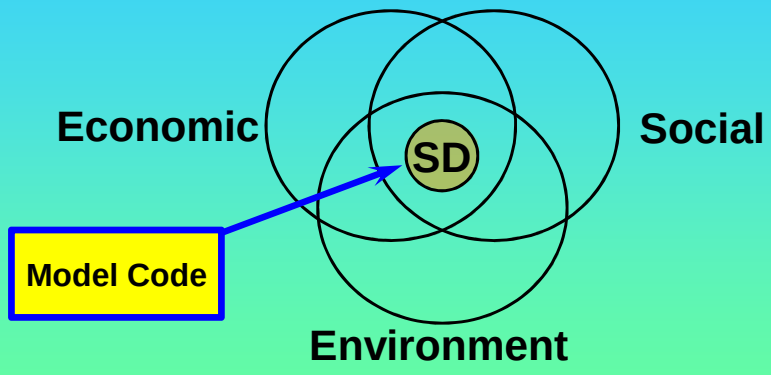
- *fib* Model Code 2010 contained many advances and addressed a range of new technical topics
- The opportunity will be taken to update to reflect recent developments



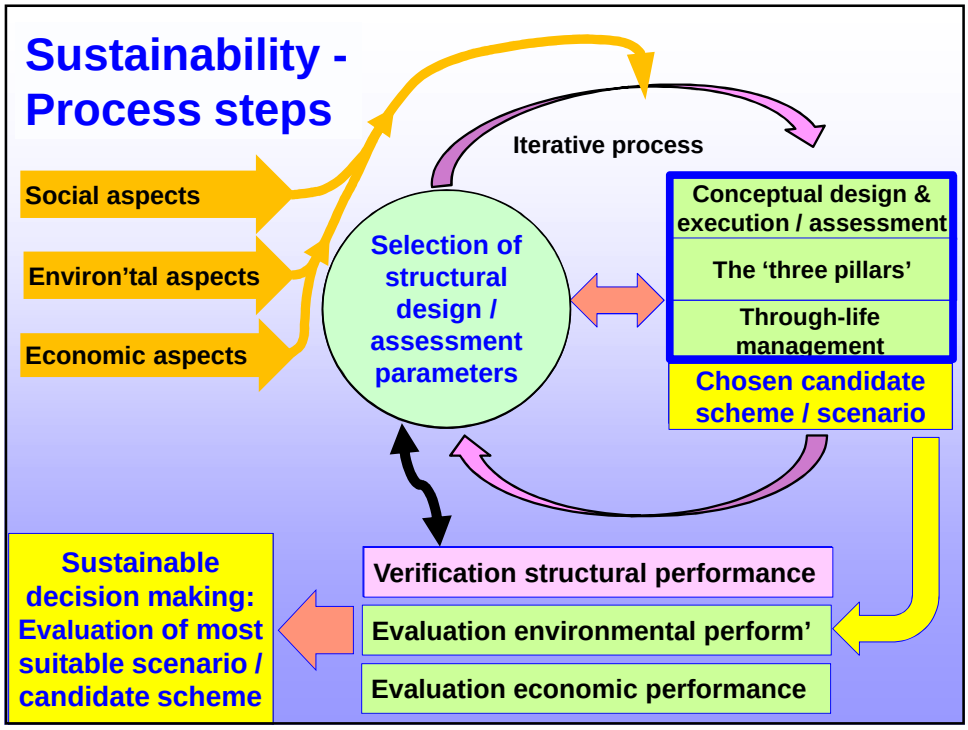
Model Code 2020: General aspirations

- *Single structural code for both new & existing concrete structures*
- *Integrated life cycle perspective*
- Holistic sustainability framework: Social, environment & economic factors
  - *Sustainability driven treatment of structural safety, service life, serviceability, durability, robustness, resilience etc*
- *Fundamental principles & safety philosophy based on reliability concepts*
- *Implementation of performance based concept*
- *Consistent approach to robustness and redundancy*
- *Utilises generalised models and level of approximation approach*
- *Removes constraints for novel types of concrete and reinforcing materials*
- *Particular attention to through-life management*
- *Takes advantage of information acquired by testing and monitoring*
- *Deterioration models for both initiation & propagation phases*
- ***To have a strong international (world) perspective***

Sustainable decision-making

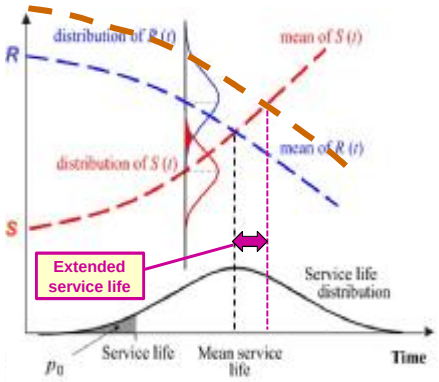


Linkage between MC2020 and the UN Sustainable Development Goals



Improved material & mechanical models for assessment of 'actual' capacity

- Performance-based design
  - Ability of a structure to fulfil the performance requirements for the design service life at required probability level
- Limit state concepts
  - Transition between the desired state and the adverse state
- Incorporation of deterioration effects reducing structural resistance R(t)
- Increase in load effect S(t) with time
- Recognition of resistance effects not accounted for in design (eg compressive membrane action) - Larger structural resistance

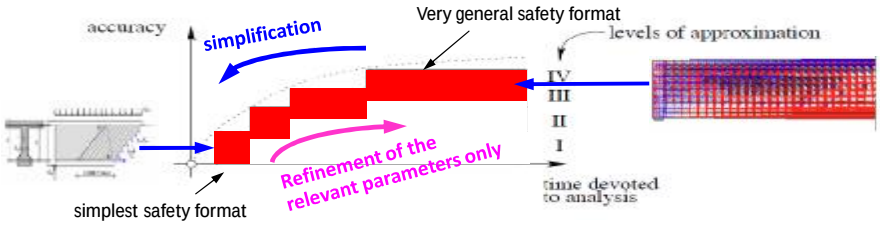


Decrease in structural resistance R(t) with time & increase in the load effect S(t) with time

Benefit of unaccounted behaviours upon structural resistance and on actual service life

Some technical objectives: LoA

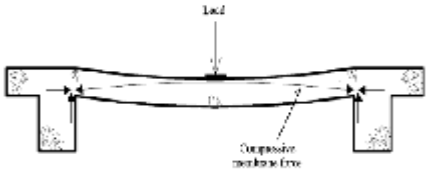
Levels of approximation / sophistication of analytical treatment – say 4



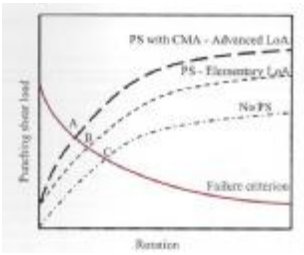
- **IV** System / global assessment of critical structures / design of special cases
- **III** In depth elemental evaluation existing structures / design of special cases
- **II** Typical elemental design / assessment
- **I** Preliminary design, non governing limit state (design and assessment)

Load-carrying behaviours not normally considered in design

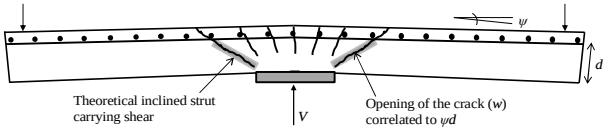
Justifying a higher load capacity in an existing concrete structure - Compressive membrane action (CMA)



CMA in laterally supported bridge deck



Effect of prestressing & CMA on the punching shear capacity & the use of LoA



Role of the rotation angle ψ in the determination of the punching shear capacity according to *fib* MC2010

Courtesy Joost Walraven

Revised MC2020 TOC

PART I	SCOPE AND TERMINOLOGY
PART II	BASIC PRINCIPLES
PART III	ACTIONS ON STRUCTURES
PART IV	INPUT DATA FOR MATERIALS
PART V	INPUT DATA FOR INTERFACES
PART VI	DESIGN AND ASSESSMENT PROCEDURES
PART VII	EXECUTION
PART VIII	THROUGH-LIFE MANAGEMENT
PART IX	DISMANTLEMENT AND REUSE

Revised MC2020 TOC - 1

PART I - SCOPE AND TERMINOLOGY

1. Scope
2. Terminology

PART II - BASIC PRINCIPLES

3. Sustainability perspective
4. Through-life management and care
5. Performance-based approach
6. Principles of structural design and assessment
7. Principles of execution
8. Principles of conservation
9. Principles of dismantlement and reuse
10. Principles of quality and information management

PART III - ACTIONS ON STRUCTURES

11. Actions on structures

Revised MC2020 TOC - 2

PART IV - INPUT DATA FOR MATERIALS

12. Concretes
13. Reinforcing steel
14. Prestressing steel & prestressing systems
15. Non-metallic reinforcement
16. Fibre reinforced concrete & UHPC
17. Protective materials & systems

PART V - INPUT DATA FOR INTERFACES

18. Bond of embedded steel reinforcement
19. Bond of embedded non-metallic reinforcement
20. Bond of externally applied reinforcement
21. Concrete to concrete
22. Concrete to steel
23. Anchorages in concrete

Revised MC2020 TOC - 3

PART VI - DESIGN AND ASSESSMENT PROCEDURES

24. Conceptual approach to design and assessment
25. Approach to assessment
26. Structural analysis and dimensioning
27. Evaluations of social (structural) performance
28. Evaluation of environmental quality
29. Evaluation of economic efficiency

PART VII - EXECUTION

30. Execution management
31. Construction works
32. Execution of interventions

Revised MC2020 TOC - 4

PART VIII - THROUGH-LIFE MANAGEMENT

33. Conservation

PART IX - DISMANTLEMENT AND REUSE

34. Dismantlement and reuse

fib Model Code 2010

MC2010
5Nr Parts
10Nr Chapters

fib Model Code 2020

MC2020
9Nr Parts
34Nr Chapters

Greatly extended technical scope and coverage

Need improved material & mechanical models for assessing existing structures

Structural models need to apply not only to the design of new structures, but also to the determination of the capacity / reliability, serviceability, remaining service life etc:

- **Load carrying behaviours not accounted for in design**
  - **Compressive membrane action**
- **Structures with inappropriate details:**
  - **Shear reinforcement is less than the prescribed minimum %**
  - **Smooth reinforcing bars (without surface ribs)**
  - **Non-compliant anchorage details / lap lengths, etc**
- **Structures experiencing deterioration:**
  - **Reinforcement corrosion**
  - **Degradation of the concrete (ASR, Sulfate attack, freeze-thaw ..) etc**

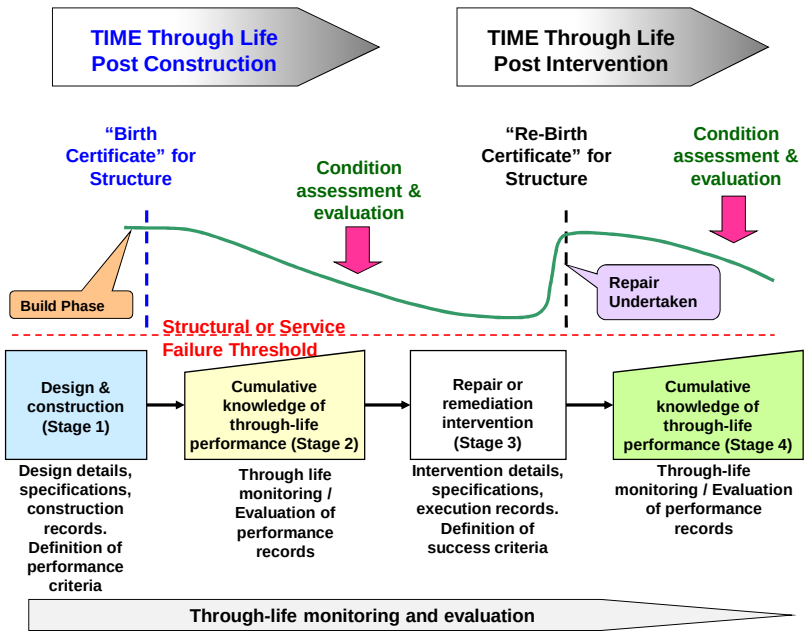
Modelling deterioration processes and propagation stages - 1

Initiation and propagation models for concrete:

- **Physical deterioration and damage processes**
  - **Frost / Freeze-thaw-salt induced deterioration of concrete**
  - **Abrasion and erosion**
  - **Physical salt crystallisation and scaling**
  - **Water penetration and water vapour transport**
- **Chemical deterioration processes**
  - **Alkali-silica reaction**
  - **Acid attack**
  - **Sulfate attack (various forms including the thaumasite form of attack)**
  - **Delayed ettringite formation (DEF)**
- **Biological deterioration processes**

Modelling deterioration processes and propagation stages - 2

- Initiation & propagation models for reinforcement corrosion :
  - Corrosion of reinforcement and prestressing components:
    - Carbonation induced and chloride induced corrosion
    - Possibly other corrosion processes
  - The influence of cracking upon deterioration in different service environments
  - Additional exposure environments - Hollow leg conditions (saline water on one face of element and air on the other)
  - Corrosion of steel fibre reinforced concrete
- The implications of cracking upon durability (other deterioration mechanisms)
- Durability assessment / residual service life after interventions



Structural condition assessment

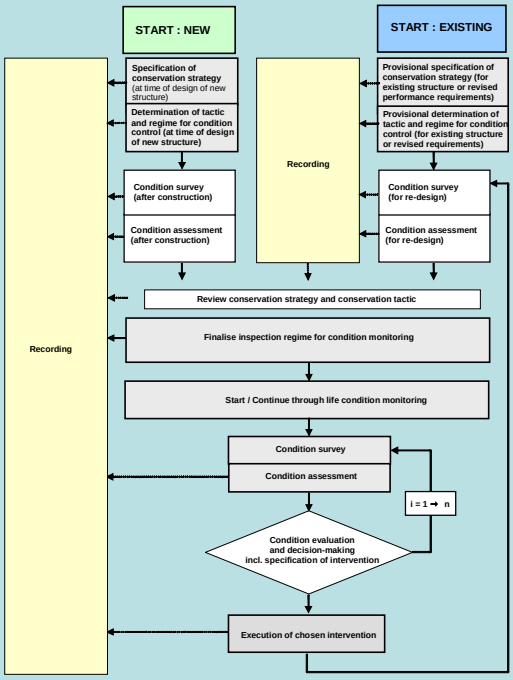
Requires evaluation of safety and serviceability.

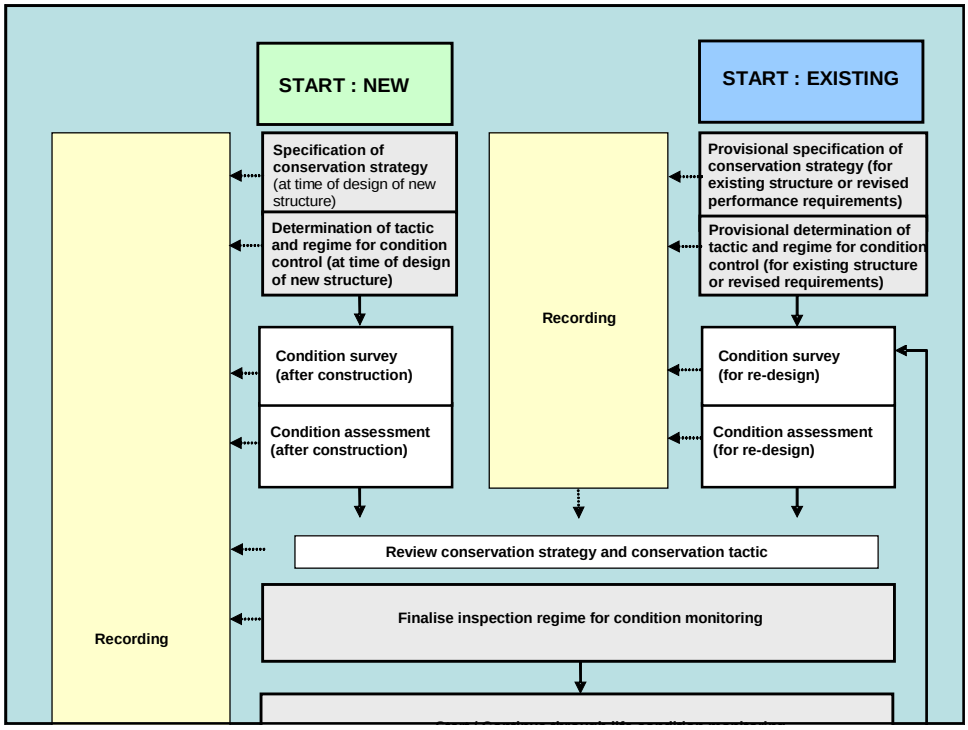
Consideration of issues such as:

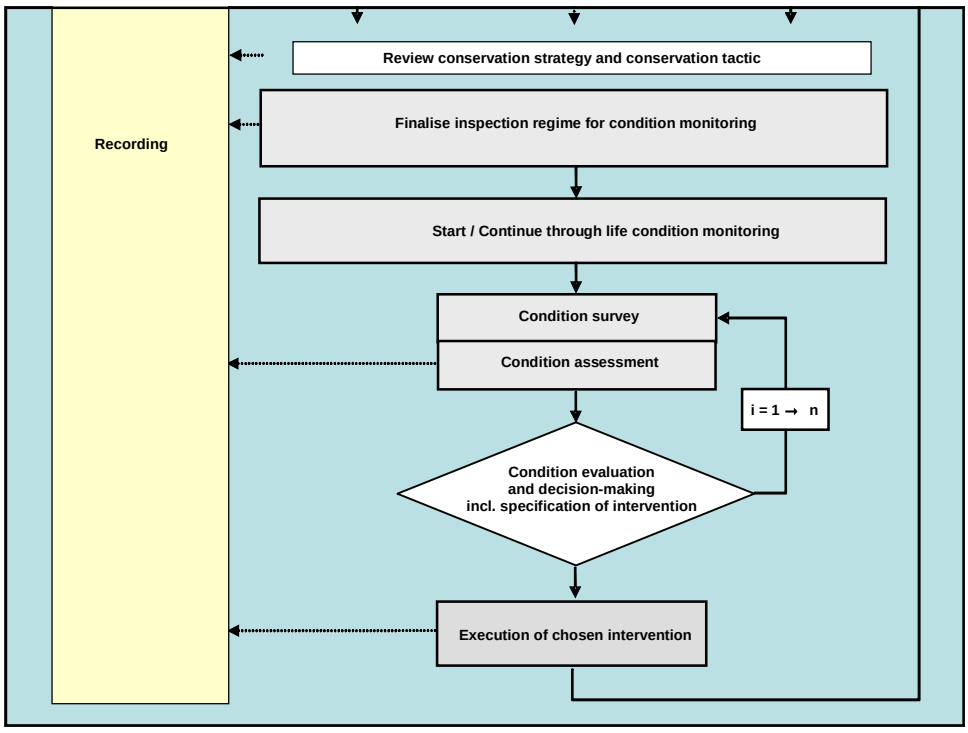
- **Structural sensitivity;**
- **The type of structure, and its function;**
- **The potential consequences of failure;**
- **Actual level of variable (imposed) loading - as distinct to that assumed in design, and;**
- **The 'real' effects of deterioration in respect of each individual action / loading effect.**

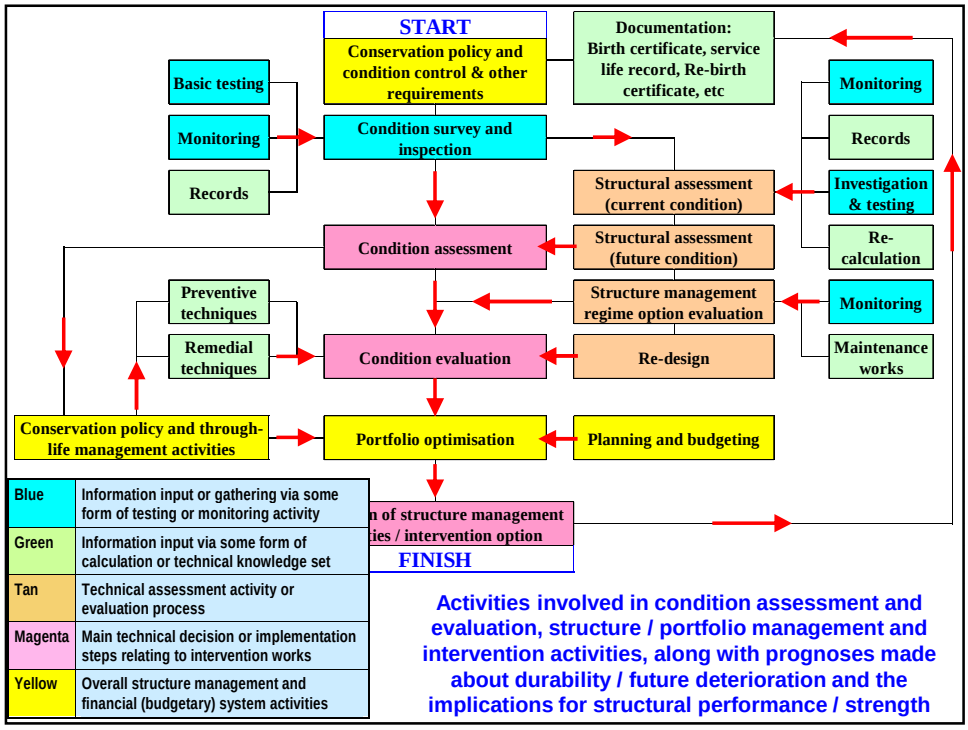
MC2010 conservation process for a concrete structure - simplified overview

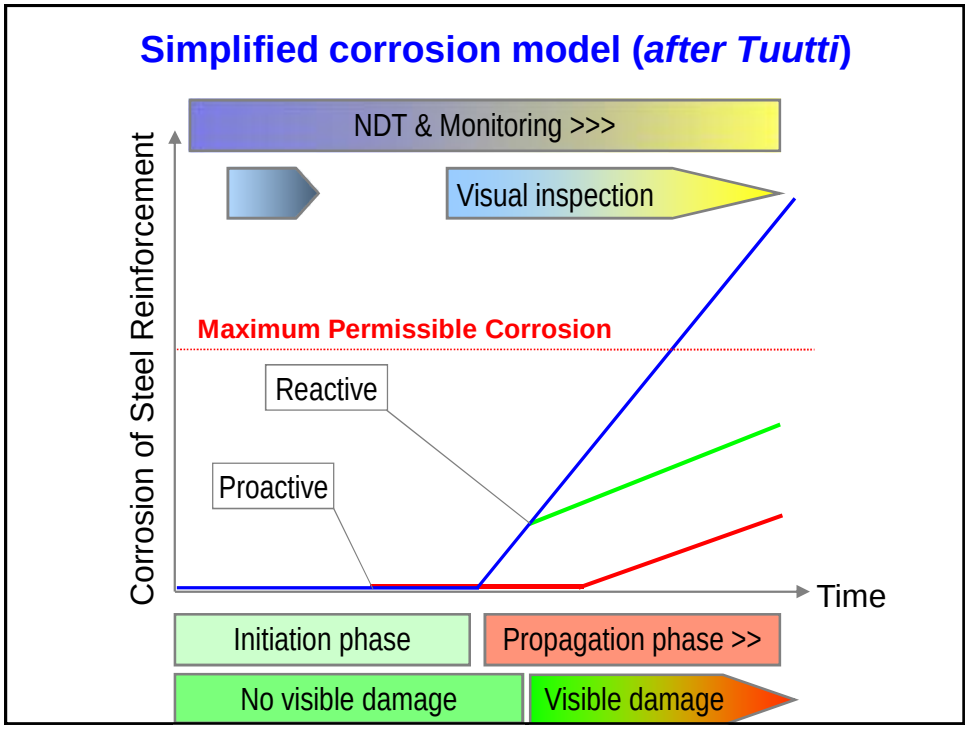
This may need to be adapted / evolved to suit other situations




START : NEW
START : EXISTING
Specification of conservation strategy (at time of design of new structure)
Determination of tactic and regime for condition control (at time of design of new structure)
Provisional specification of conservation strategy (for existing structure or revised performance requirements)
Provisional determination of tactic and regime for condition control (for existing structure or revised requirements)
Recording
Condition survey (after construction)
Condition assessment (after construction)
Condition survey (for re-design)
Condition assessment (for re-design)
Review conservation strategy and conservation tactic
Finalise inspection regime for condition monitoring
Recording

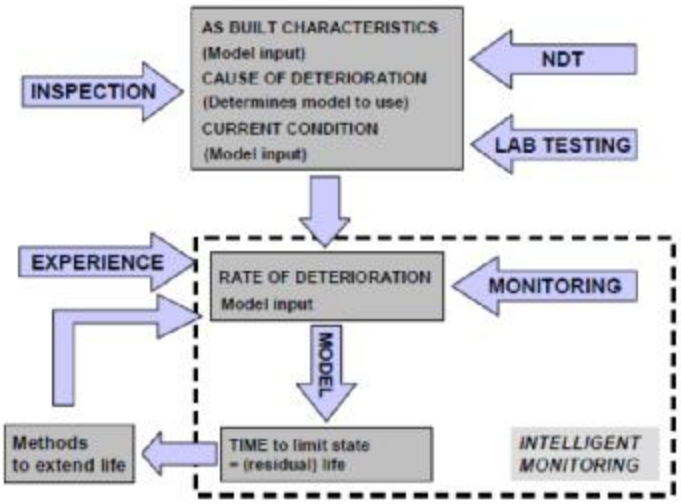

Recording
Review conservation strategy and conservation tactic
Finalise inspection regime for condition monitoring
Start / Continue through life condition monitoring
Condition survey
Condition assessment
i = 1 → n
Condition evaluation and decision-making incl. specification of intervention
Execution of chosen intervention


START
Conservation policy and condition control & other requirements
Documentation: Birth certificate, service life record, Re-birth certificate, etc
Basic testing
Monitoring
Records
Condition survey and inspection
Monitoring
Records
Structural assessment (current condition)
Investigation & testing
Condition assessment
Structural assessment (future condition)
Re-calculation
Preventive techniques
Remedial techniques
Condition evaluation
Structure management regime option evaluation
Re-design
Monitoring
Maintenance works
Conservation policy and through-life management activities
Portfolio optimisation
Planning and budgeting
Blue
Information input or gathering via some form of testing or monitoring activity
Green
Information input via some form of calculation or technical knowledge set
Tan
Technical assessment activity or evaluation process
Magenta
Main technical decision or implementation steps relating to intervention works
Yellow
Overall structure management and financial (budgetary) system activities
FINISH
Activities involved in condition assessment and evaluation, structure / portfolio management and intervention activities, along with prognoses made about durability / future deterioration and the implications for structural performance / strength

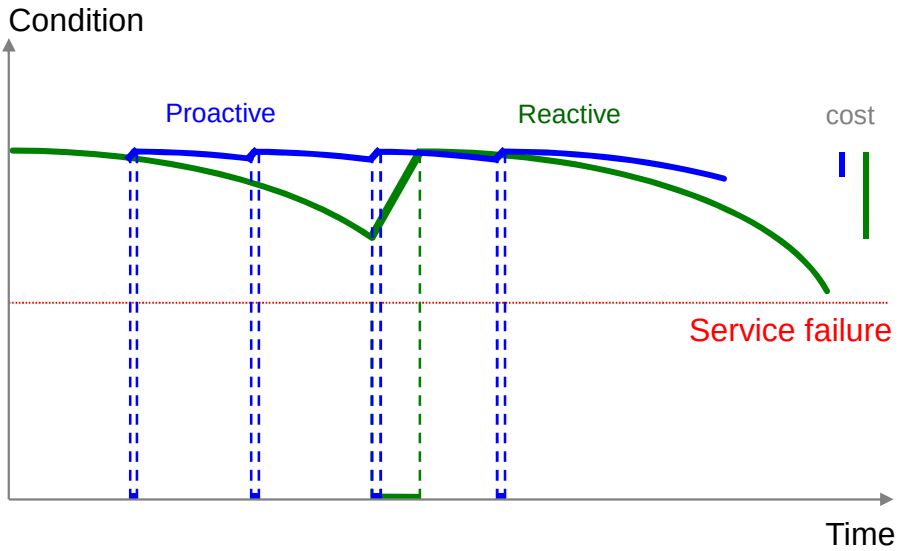

Simplified corrosion model (after Tuutti)
NDT & Monitoring >>>
Visual inspection
Maximum Permissible Corrosion
Reactive
Proactive
Corrosion of Steel Reinforcement
Time
Initiation phase
Propagation phase >>
No visible damage
Visible damage

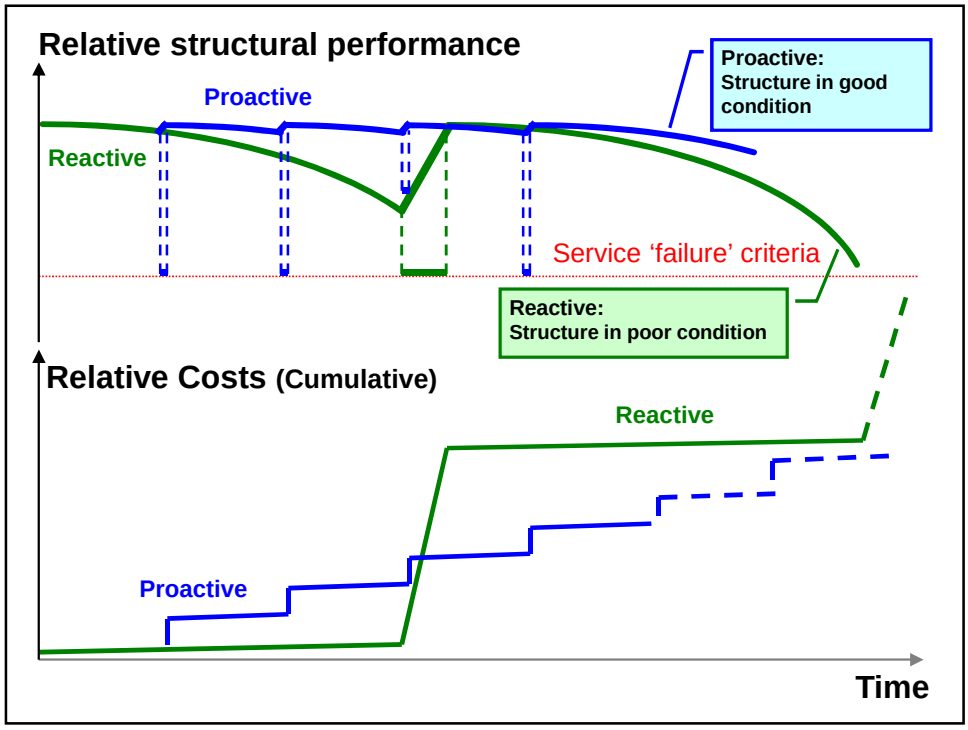
Life cycle management

Role of monitoring and the value of information in the management of concrete structures & decision making



Proactive & reactive approaches to through-life care of structures





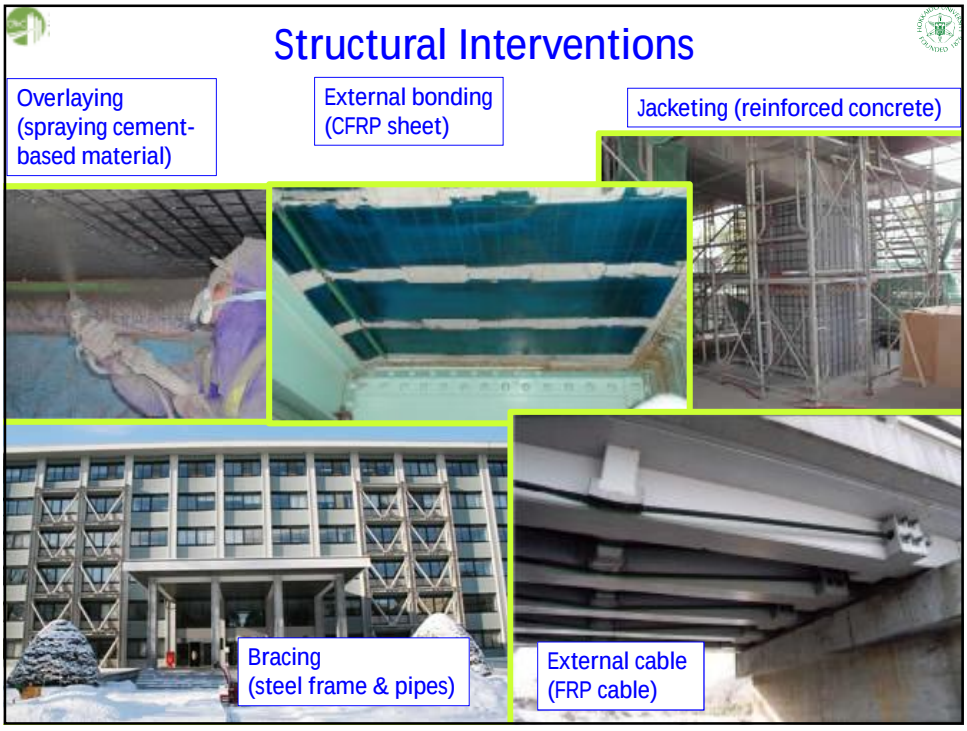
Conservation strategies in MC2020

- ***Strategy A:*** **Structures which are to be managed by planned condition control activities.**
  - **Structures where deterioration would be technically unacceptable or must not be seen.**
  - **Monumental, important or sensitive buildings & structures.**
- ***Strategy B:*** **Structures or parts thereof which are managed by reactive activities.**
  - **Structures where remedial measures can be taken after deterioration becomes visible.**
  - **Buildings and other common structures.**
- ***Strategy C:*** **Structures or parts thereof for which condition control is not practical.**
  - **Structures where it would be difficult economically and / or technically for preventative or remedial measures to be taken, such as foundations.**

List of interventions - After ISO 16311: Parts 3 & 4

Remedy	Examples of Repair Strategies & Methods
Protection against ingress	For details refer to Table 1 in paper
Moisture control	
Concrete restoration	
Increased physical resistance	
Increased resistance to chemical attack	
Preserve or restore passivity	
Increase resistivity	
Cathodic control	
Cathodic protection / prevention	
Control of anodic areas	
Structural strengthening	
Adding new systems / devices for controlling structural response	

Structural Interventions



Non-structural Interventions

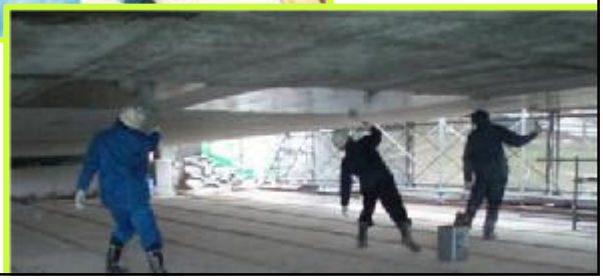
Crack injection (injecting resin)

(Photo: SHO-BOND Corporation)

Prevention of concrete peel off (external bonding of FRP sheet)

Surface protection (coating resin)

(Photo: Fuji PS Corporation)



Example of interventions for reinforcement corrosion – Table 2 in paper

Stage 1: No change in appearance: Chloride ion concentration at depth of reinforcing bar **below** corrosion threshold		
Deterioration / distress	Repair policy	Repair method examples
See Paper for details	See Paper for details	See Paper for details

Stage 2: No change in appearance: Chloride ion concentration at depth of reinforcing bar **above** corrosion threshold		
Deterioration / distress	Repair policy	Repair method examples
See Paper for details	See Paper for details	See Paper for details

Stage 3: Concrete exhibiting cracking, spalling and rust staining		
Deterioration / distress	Repair policy	Repair method examples
See Paper for details	See Paper for details	See Paper for details

Stage 4: Rebar corrosion having caused a reduction in load capacity (strength) of affected members		
Deterioration / distress phenomena	Repair policy	Repair method examples
See Paper for details	See Paper for details	See Paper for details

Measures for existing structures

Many existing structures do not satisfy performance requirements due to

- Construction to outdated codes
- Damage by environmental actions, loadings, natural / manmade disasters

↓

Assessment of performance of existing structures

↓

Remedial action (Intervention) for improving performance of existing structures

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MC2020 content on interventions

Related revisions of MC2010

- **Greatly extended section on interventions**
- **Treatment of interventions harmonised with ISO 16311**
- **Addition of materials for interventions and protection systems (Part 4: Materials)**
- **Addition of bond of intervention materials to substrate concretes (Part 5: Interface characteristics)**
- **Addition of design of interventions, such as overlaying (Part 6: Design and assessment procedures)**
- **Addition of assessment of condition (damage / degradation) in existing structures, and effect after intervention undertaken (Part 6: Design and assessment procedures)**
- **Addition of execution of interventions (Part 7. Execution)**
- **Addition of conservation after intervention (Part 8: Through-life management / Conservation)**

Compendium for Interventions on Concrete Structures: *TG 8.1 & TG 3.4*

1. Protection Methods

- **1.1. Surface protection methods**
- **1.2. Electrochemical methods**

2. Repair Methods

- **2.1. Material reinstatement**
- **2.2. Concrete crack repair**

3. Strengthening Methods

- **3.1. Strengthening existing members**
- **3.2. Adding new structural members**
- **3.3. Adding new systems/devices**

Compendium for Interventions on Concrete Structures: *TG 8.1 & TG 3.4*

1. Protection Methods

1.1. Surface protection methods

- ***1.1.1. Impregnation of concrete surface***
- ***1.1.2. Hydrophobic impregnation of concrete surfaces***
- ***1.1.3 Coating of concrete surfaces***
- ***1.1.4. Over-cladding of concrete members***
- ***1.1.5. Application of membranes***
- ***1.1.6. Corrosion inhibitors for steel rebars***

1.2. Electrochemical methods

- ***1.2.1. Corrosion control***
- ***1.2.2. Cathodic prevention***
- ***1.2.3. Cathodic protection***
- ***1.2.4. Realkalisation***
- ***1.2.5. Chloride extraction / Desalination***
- ***1.2.6. Dehumidification***
- ***1.2.7 Impressed current cathodic protection – structural strengthening***

Compendium for Interventions on Concrete Structures: *TG 8.1 & TG 3.4*

2. Repair Methods

2.1. Material reinstatement

- *2.1.1. Patch-repair (hand-applied mortar)*
- *2.1.2. Concrete replacement (cast-in-place)*
- *2.1.3. Concrete replacement (shotcrete)*
- *2.1.4. Concrete autogenous healing*
- *2.1.5. Rebar replacement*
- *2.1.6 Repair of prestress tendons through reinjection of grout*

2.2. Concrete crack repair

- *2.2.1. Injection for sealing concrete cracks*
- *2.2.2. Concrete crack arrest*
- *2.2.3. Surface bandaging of cracks*
- *2.2.4. Turning cracks into joints*

Compendium for Interventions on Concrete Structures: *TG 8.1 & TG 3.4*

3. Strengthening Methods - 1

3.1. Strengthening existing members

- *3.1.1. RC jacketing*
- *3.1.2. FRP jacketing*
- *3.1.3. Steel jacketing*
- *3.1.4. Addition of reinforcement*
- *3.1.5. Concrete overlay*
- *3.1.6. Textile-reinforced concrete (TRC) jacketing)*
- *3.1.7. Externally applied steel plates*
- *3.1.8. Externally applied or near surface mounted FRP*
- *3.1.9. Strengthening foundations with steel micro-piles*

Compendium for Interventions on Concrete Structures: *TG 8.1 & TG 3.4*

3. Strengthening Methods – *Continued* - 2

3.1. Strengthening existing members

……..

3.2. Adding new structural members

3.2.1. Steel bracing

3.2.2. Concrete shear walls

3.3. Adding new systems/devices

3.3.1. External post-tensioning

3.3.2. Base-isolation devices

3.3.3. Energy-absorption devices

Compendium for Interventions on Concrete Structures: Description of Methods for making Interventions on Concrete Structures - 1

Main section headings of Template

1. **Foreword**
2. **Basics**
3. **Stakeholders' Roles and Qualifications**
4. **Design**
5. **Execution**
6. **Quality Control**
7. **Monitoring and Maintenance**

Plus case history examples

Description of Methods for making Interventions on Concrete Structures - 2

1. **Foreword**
2. **Basics**
   - 2.1. When to adopt this method
   - 2.2. Materials and systems
   - 2.3. Techniques
   - 2.4. Equipment
3. **Stakeholders' Roles and Qualifications**
   - 3.1. Owner
   - 3.2. Designer
   - 3.3. Contractor
   - 3.4. User

Description of Methods for making Interventions on Concrete Structures - 3

4. **Design**
   - 4.1. Assessment of existing conditions
   - 4.2. Service life
   - 4.3. Reliability requirements
   - 4.4. Codes and standards and other relevant references
   - 4.5. Design assumptions
   - 4.6. Design procedure
   - 4.7. Supporting documents
5. **Execution**
   - 5.1. Preparatory works
   - 5.2. Systems trials
   - 5.3. Execution procedure
   - 5.4. Finishing

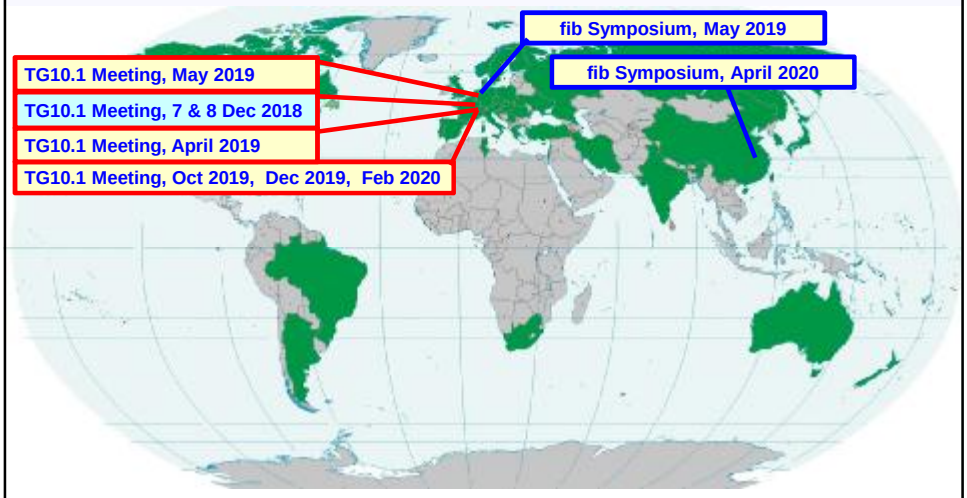
Description of Methods for making Interventions on Concrete Structures - 4

6. **Quality Control**
   - 6.1. Quality control of materials
   - 6.2. Quality control before intervention
   - 6.3. Quality control during intervention
   - 6.4. Quality control after intervention
7. **Monitoring and Maintenance**
   - 7.1. Monitoring
   - 7.2. Maintenance
   - 7.3. Post-intervention documentation

fédération internationale du béton - International spread of national groups

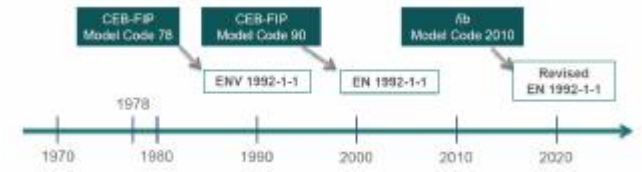
Looking for global involvement and contributions to MC2020

fédération internationale du béton - International spread of national groups



Looking for global involvement and contributions to MC2020

Evolution of *fib* Model Codes for structural concrete



MC2020 will, for the first time, include comprehensive provisions for existing structures

Developing *fib* MC2020

T10.1 Model Code 2020 : Co-ordinating & drafting body for MC2020 activated Oct 2016 (Lausanne)

Chair:	**Stuart Matthews**	(BRE, UK)
Co-Chairs:	**Giuseppe Mancini** **Joost Walraven**	(Politecnico di Torino, Italy) (Delft University of Technology, Netherlands)
Deputy-Chair:	**Agnieszka Bigaj-van Vliet**	(TNO, Netherlands)
Technical Secretary:	**Gerrie Dieteren**	(TNO, Netherlands)

Chairs of **all fib Commissions**
Convenors of the **MC2020 Action Groups (12Nr)**

Regional contacts : **Africa, Asia, Europe, North America & South America**

Contacts for international organizations incl. bodies such as **CEN, ISO, JCI, ACI, PCI, JCSS & RILEM**

Other invited fib members incl. representatives of MC2020 Action Groups

Acknowledgements

- ***MC2020 project*** *- The numerous colleagues who have already contributed to the various workshops, along with the development and evolution of ideas for MC2020*
- ***MC2010*** *- The good starting point that this provides for the current work. Thanks to all those who worked on the development of MC2010, but in particular to Joost Walraven & Agnieszka Bigaj for their tremendous work in bringing that document together*

fib Model Code 2020 -
for new and existing concrete structures

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