



AMANAC WORKSHOP

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WHAT KIND OF BUILT ENVIRONMENT FOR FUTURE GENERATIONS?

Designing for longer lasting built environment: a Life Cycle Analysis perspective

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The projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 760639 (EnDurCrete), 760824 (ReSHEALience) and 761072 (DACOMAT)

Introduction

Sustainable development has been defined as “*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*”



On 1 January 2016, the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development — adopted by world leaders in September 2015 at an historic UN Summit — officially came into force.

With these new goals, countries will mobilize efforts to end poverty, fight inequalities and tackle climate change



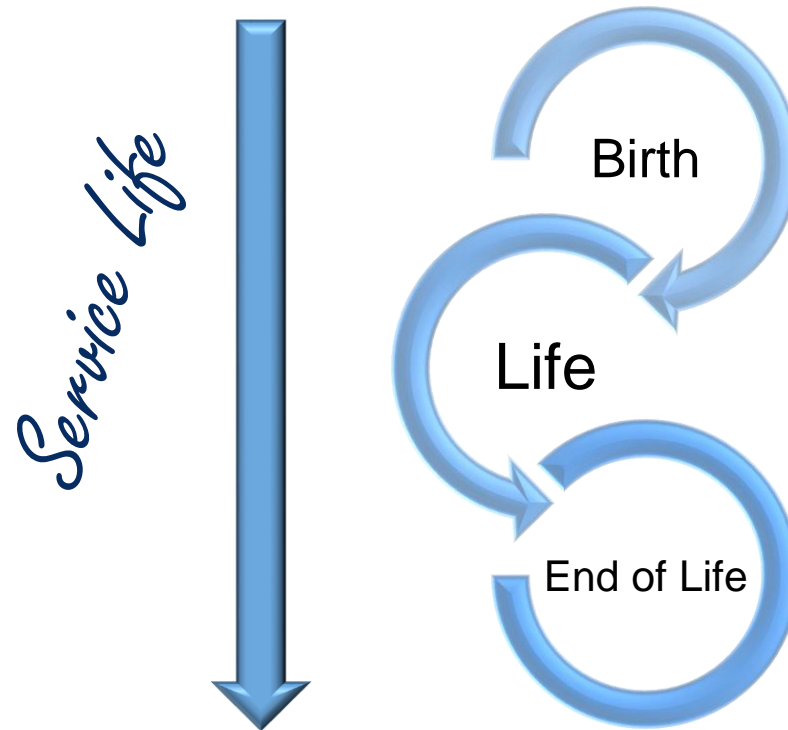
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Introduction

Sustainable development can be pursued in various ways, such as **focusing on innovation, safety, resource efficiency, and others**

In terms of sustainable development of product/services, a **Life Cycle Approach** can be helpful



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Sustainable Goals – ReSHEALience Project

To provide an innovative contribution to sustainable development of infrastructures, it is possible to work on service life extension



The main goal of the project ReSHEALience is to develop an Ultra High Durability Concrete (UHDC) and a Durability Assessment-based Design (DAD) methodology for structures, to improve durability and predict their long-term performance under Extremely Aggressive Exposures

One of the Key Performance Indicators (KPI 2a) is the increase of at least 30% of concrete service life



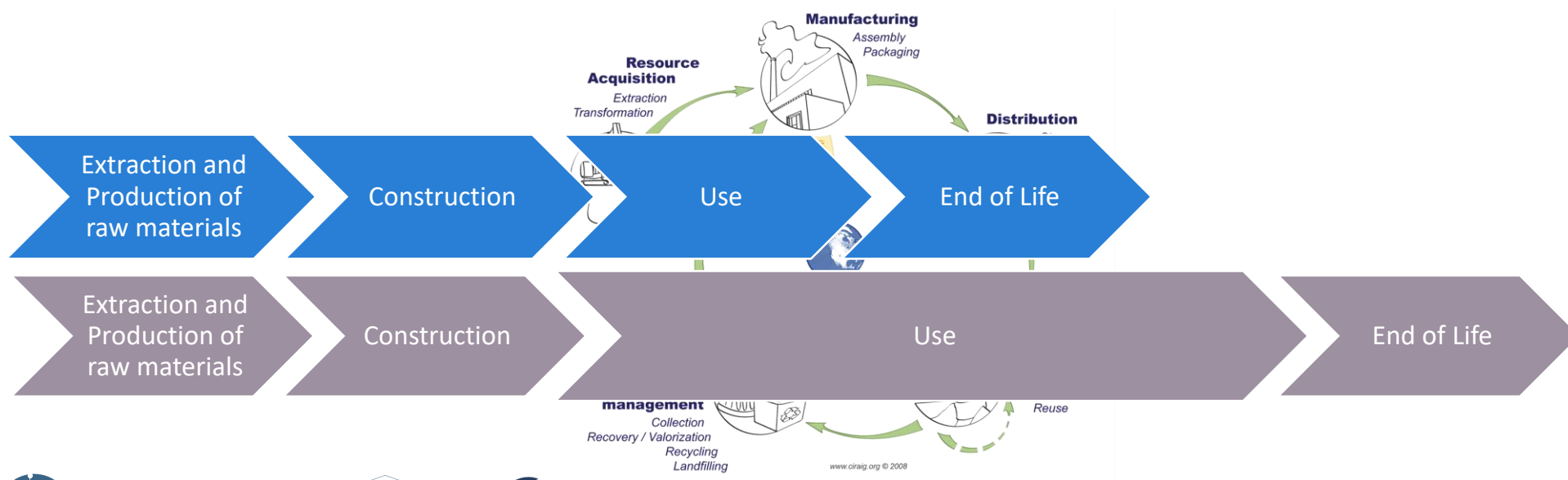
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Sustainable Goals – ReSHEALience Project

Nevertheless, it is not obvious that, even with a longer service life, infrastructures made in UHDC are more sustainable than infrastructures made in traditional concrete.

For this reason, it is important to study the overall life-cycle of the developed solutions and verify that UHDC provides the best performance in environmental, economic and social terms.



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Methodologies for Sustainability assessment in construction industry

In order to perform sustainability assessment, a set of proven methodologies for measuring and analyzing consequences of products under investigation has to be used.

Environmental Life-Cycle Assessment (**LCA**)



Life-Cycle Costing (**LCC**)



Social LCA (**S-LCA**)



**Life-Cycle
Sustainability
Assessment
(LCSA)**



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Focus on LCA

INTERNATIONAL
STANDARD

ISO
14040

Second edition
2006-07-01

**Environmental management — Life cycle
assessment — Principles and framework**

*Management environnemental — Analyse du cycle de vie — Principes
et cadre*

**3.2
life cycle assessment
LCA**

compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle

INTERNATIONAL
STANDARD

ISO
14044

First edition
2006-07-01

**Environmental management — Life cycle
assessment — Requirements and
guidelines**

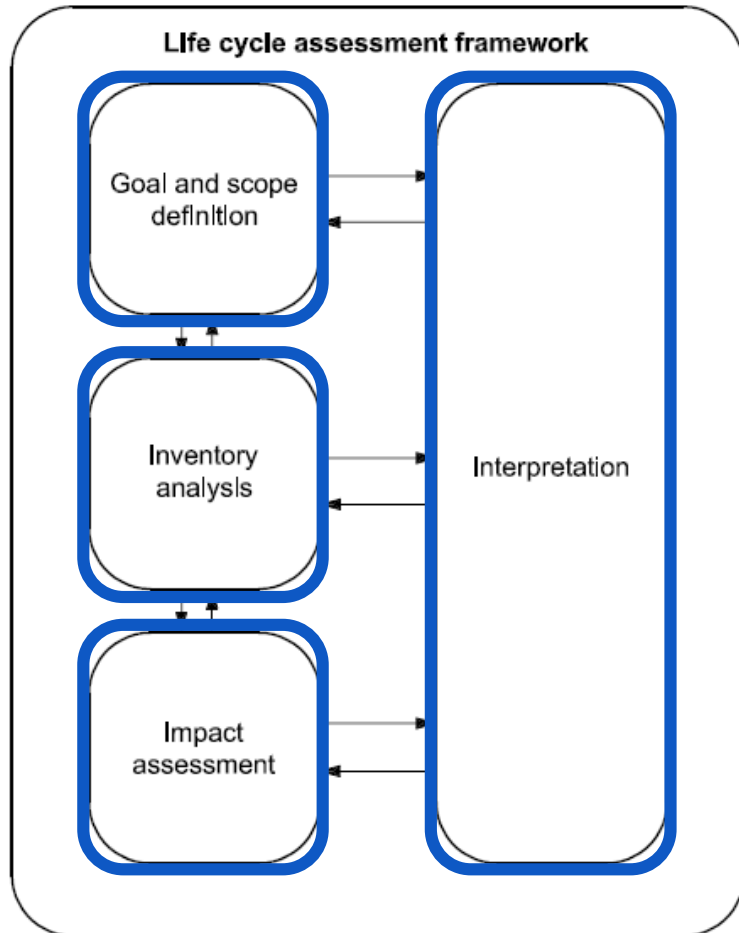
*Management environnemental — Analyse du cycle de vie — Exigences
et lignes directrices*



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Focus on LCA



Why?
For whom?
How?

G&S: description of motivations and aims of the study. Definition of Functional Unit and System Boundaries.

What?
How many?

LCI: description of the product and its process units included in the system, considering single inputs/outputs

How?
Where?
How many?

LCIA: assessment of impacts quantities, generated by inputs/outputs identified in the inventory phase and related to the product system.

Why?

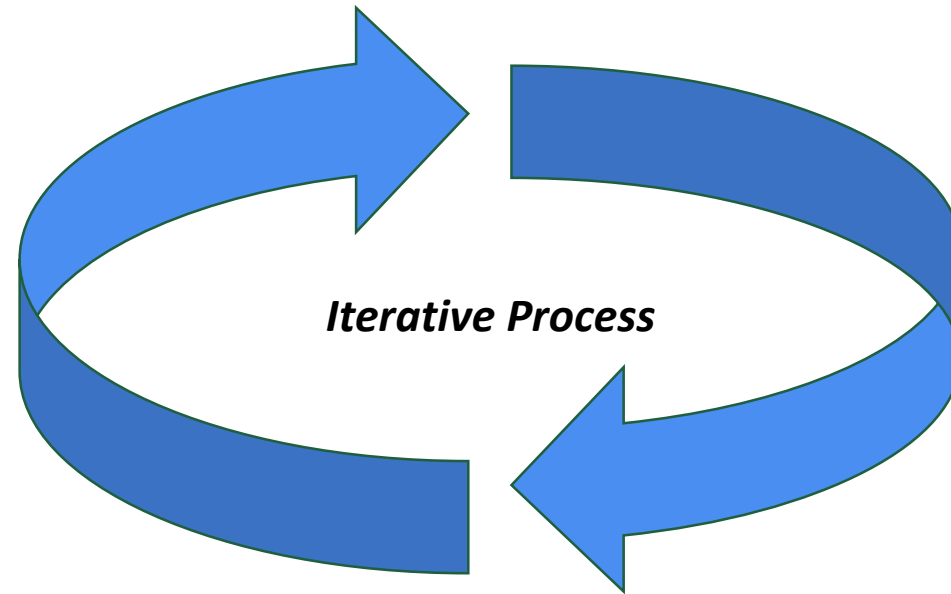
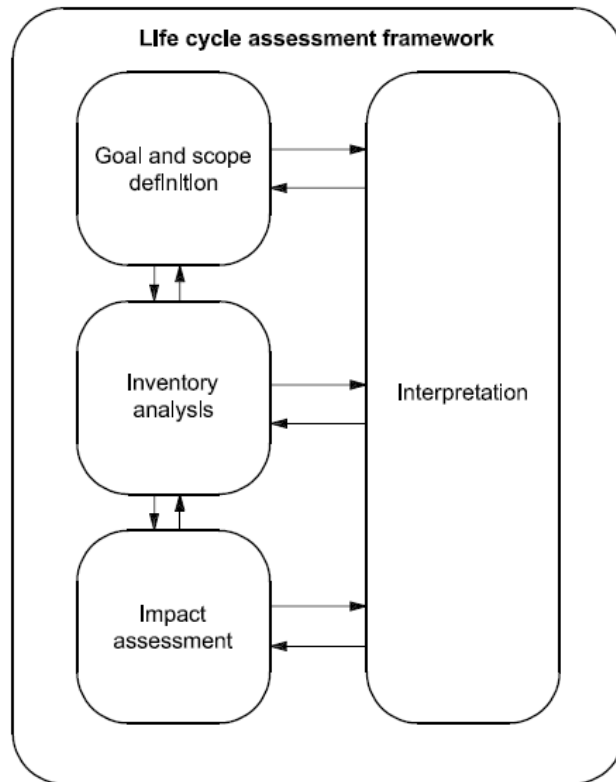
Interpretation: results interpretations and conclusions. *Analyses for “continuous improvement”.*

Focus on LCA

Interpretation

Analyses for “continuous improvement”

Comparisons among different solutions
(ReSHELIence: different mix designs)



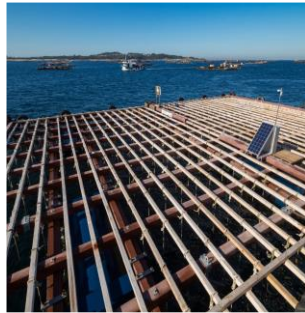
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LCA – ReSHEALience Project – Infrastructures under investigation



**Offshore
Acquaculture
Raft (RDC Pilot)**

Traditional Solution – Wooden beams

Innovative Solution – UHPC beams*



**Cooling Tower
Water Basin
(EGP Pilot)**

Traditional Solution – OPC

*2 Innovative Solutions – UHDC**

*For innovative solutions, LCA has to be performed also at material level

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Thank you for your attention

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