

WG 1 – Testing of cement based materials

Strategic view

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Short introduction


Some facts:

- Testing of cement based materials (CBMs) is a difficult and extremely challenging task.
- It is essential to recognize properties of the materials and consequently to ensure a designed lifespan, durability, and serviceability of concrete structures.
- A good knowledge of the evolution of microstructure and associated early age properties of CBMs is becoming more and more important. Moreover, early age period can be considered as the most important period in the evolution of various properties of CBMs.

Advanced techniques used to evaluate properties of CBMs:

- Especially during the last two decades, several advanced techniques have been developed for determining different properties of CBMs.
- These techniques are usually nondestructive and allow continuous monitoring of early age properties of CBMs.
- Most of these techniques are not widely accepted – new guidelines, recommendations, and/or standards have to be performed and the developed products (setups, softwares, etc.) introduced to the global market (WG3).

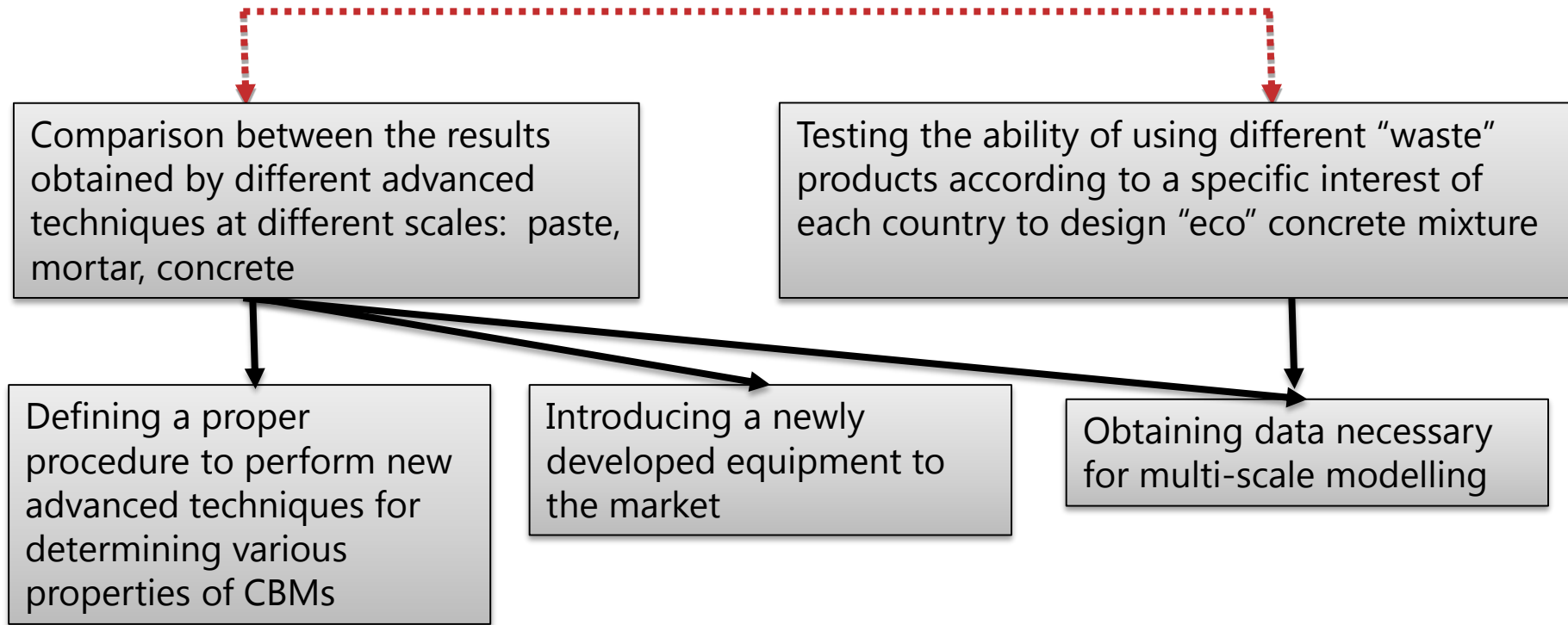
Main objectives of WG1 and link to other WGs



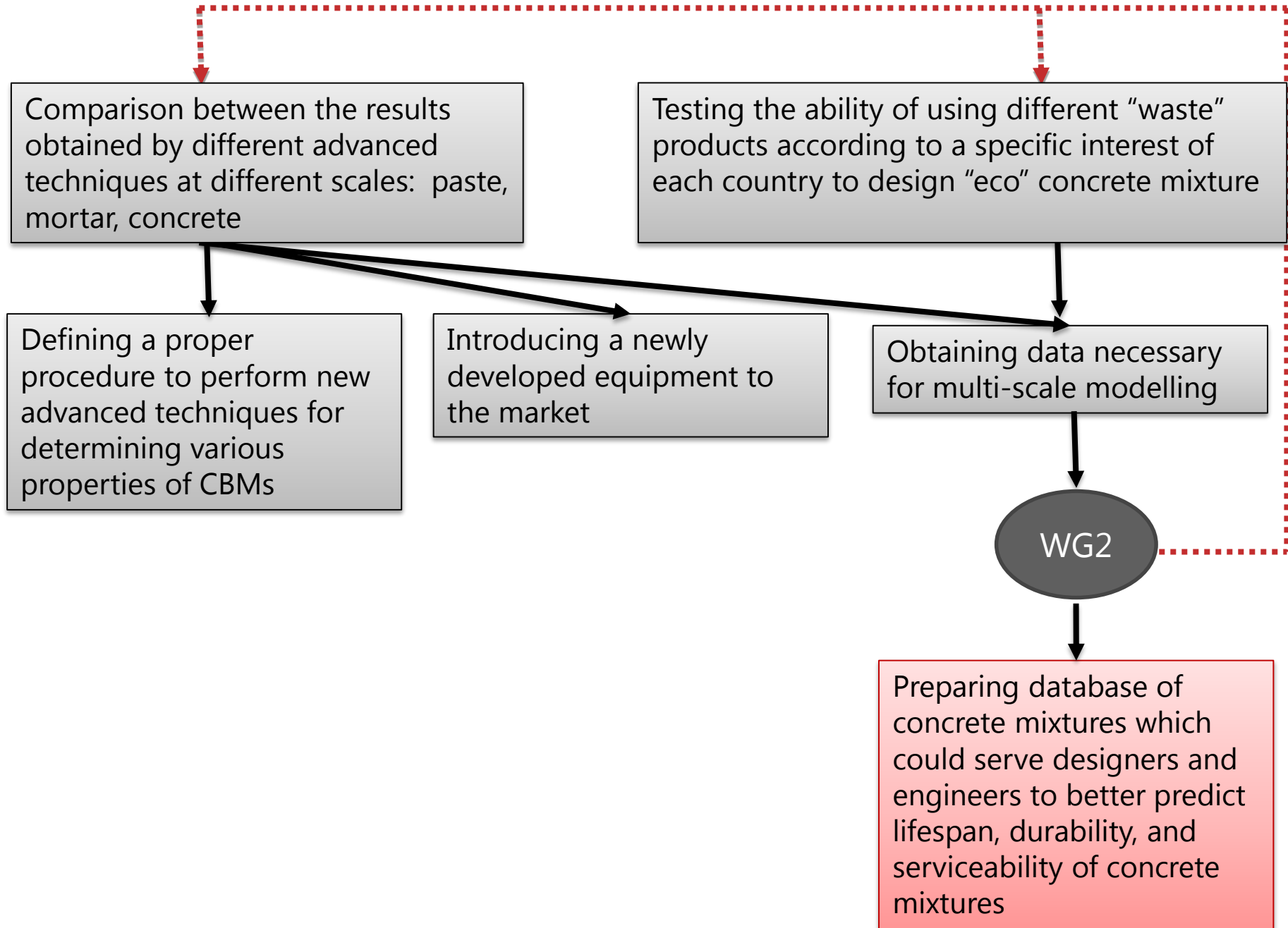
Comparison between the results obtained by different advanced techniques at different scales: paste, mortar, concrete

Testing the ability of using different “waste” products according to a specific interest of each country to design “eco” concrete mixture

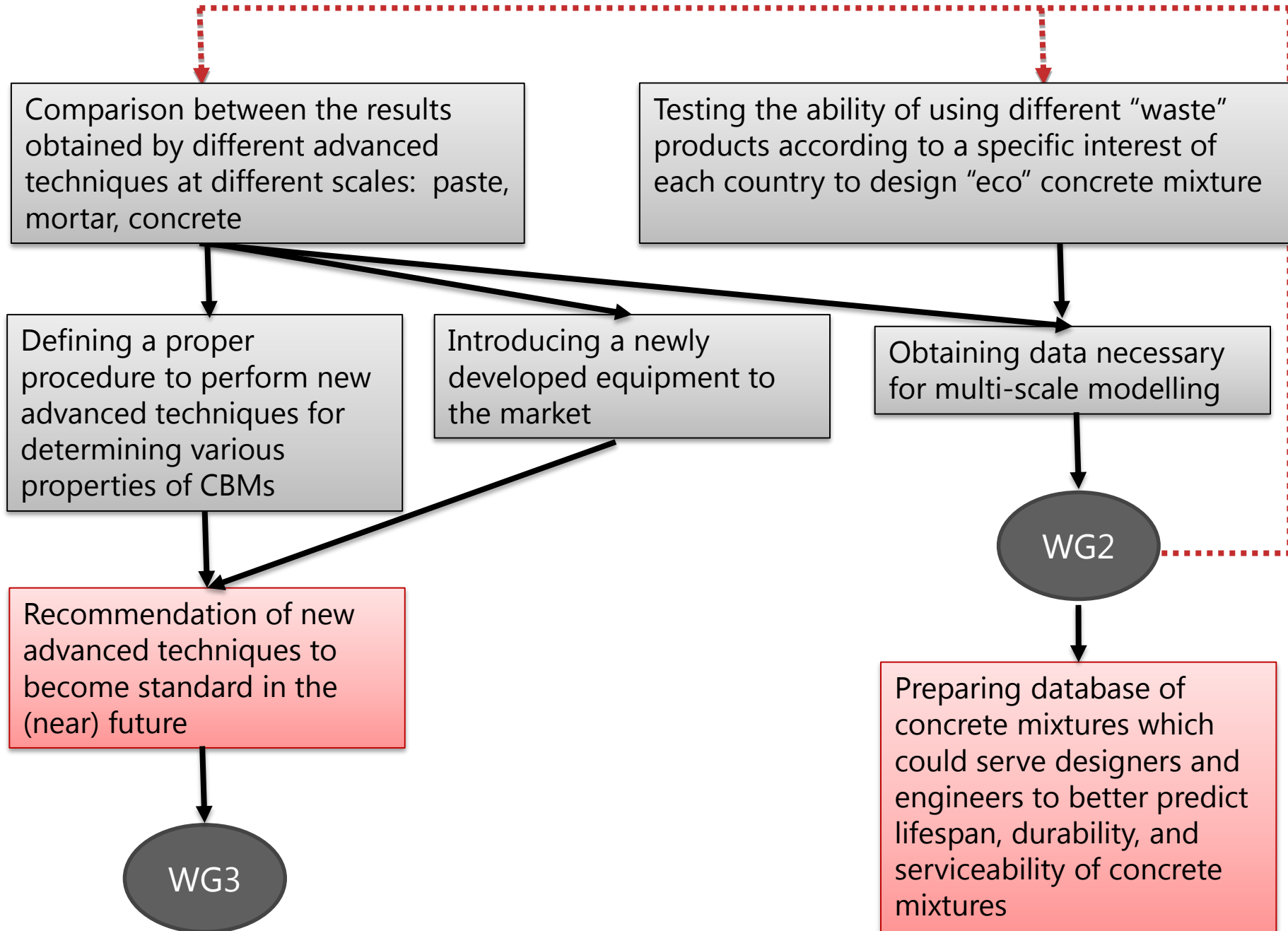
Main objectives of WG1 and link to other WGs



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Main objectives of WG1 and link to other WGs



Methodology

- **Round Robin Test (RRT)**
- **Several Group Priorities (GPs)**

Group Priorities:

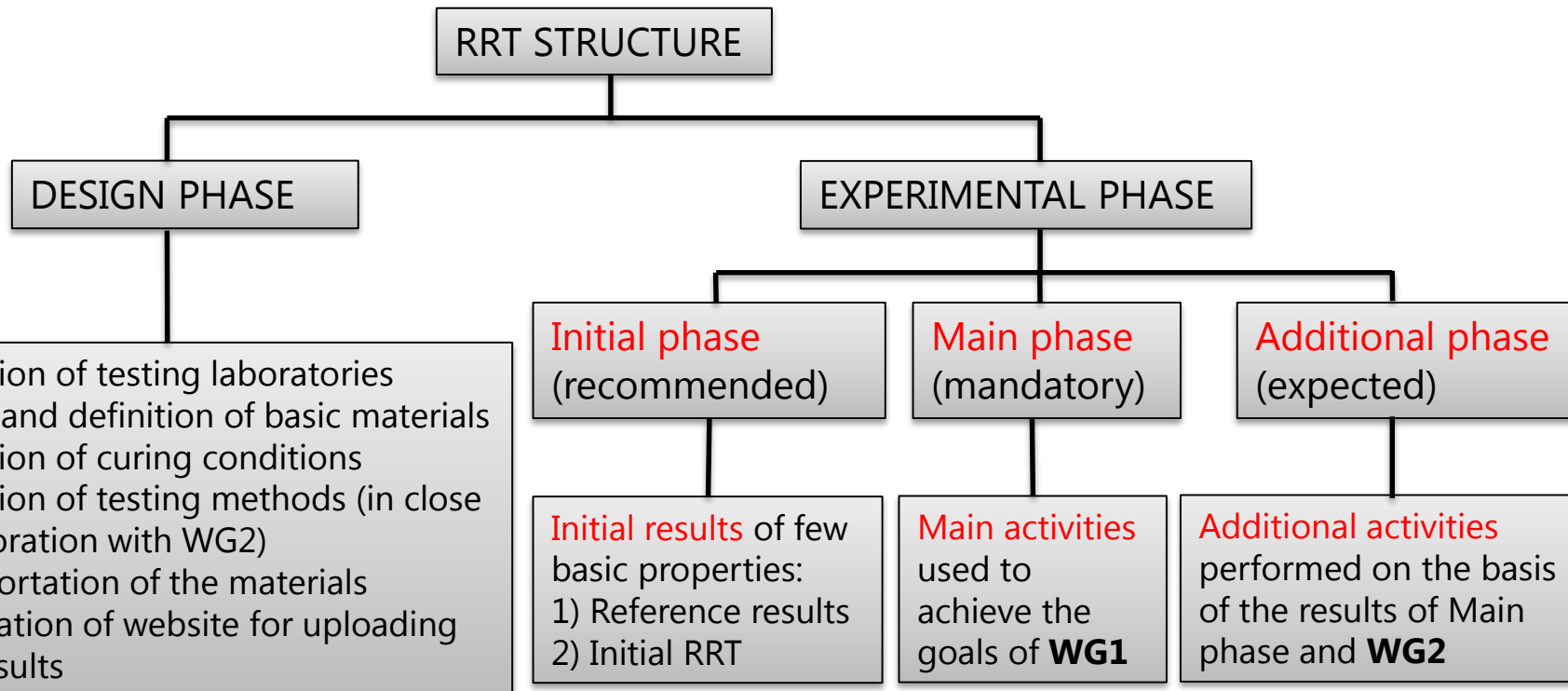
To perform the experimental program systematically, 6 group priorities have been defined:

- 1) **GP1a: *fresh properties and setting*** (rheology and setting time),
- 2) **GP1b: *chemical and microstructural characterization*** (porosity, TGA, SEM, XRD),
- 3) **GP1c: *transport properties and boundary effects*** (thermal conductivity, specific heat, density and diffusion, sorption isotherms, permeability, convection coefficient, solar radiation, night cooling, evaporative cooling, electrical properties),
- 4) **GP1d: *mechanical properties and creep*** (compressive, bending and tensile strength, Young's modulus and Poisson's ratio, creep and relaxation),
- 5) **GP1e: *volume stability*** (thermal dilation associated with hydration heat; autogenous and drying shrinkage),
- 6) **GP1f: *fracture properties and cracking*** (due to applied mechanical loads and/or restraint deformations).

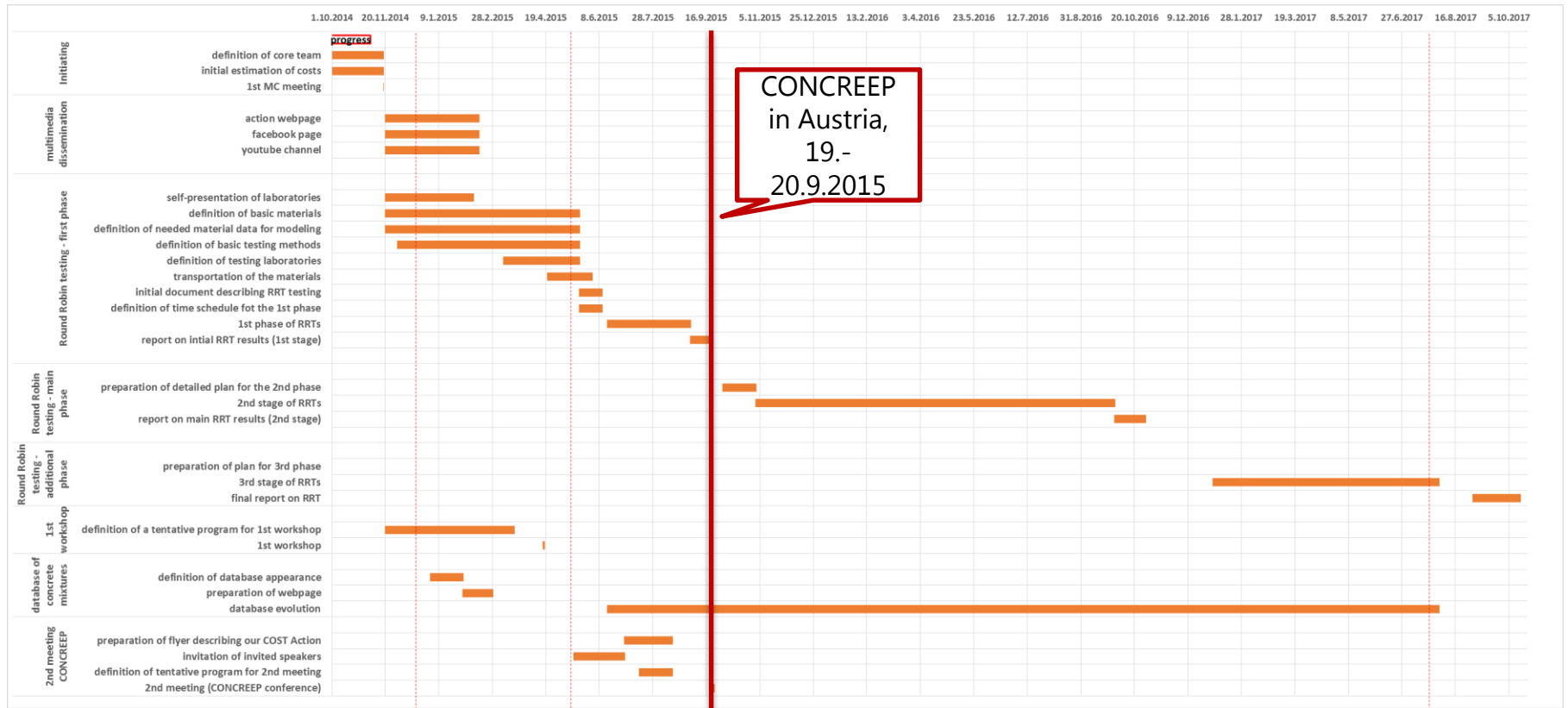
Methodology

Round Robin Test (RRT)

A dominant mechanism to achieve the objectives of WG1 is RRT which will be performed on different materials, preferably **two concretes** (normal concrete and eco concrete) and corresponding **mortar and cement paste mixtures**.



Gantt diagram (draft)



Realistic schedule for 1st year of the Action

Possible schedule for next years of the Action

Gantt diagram (draft) – 1st year of the Action

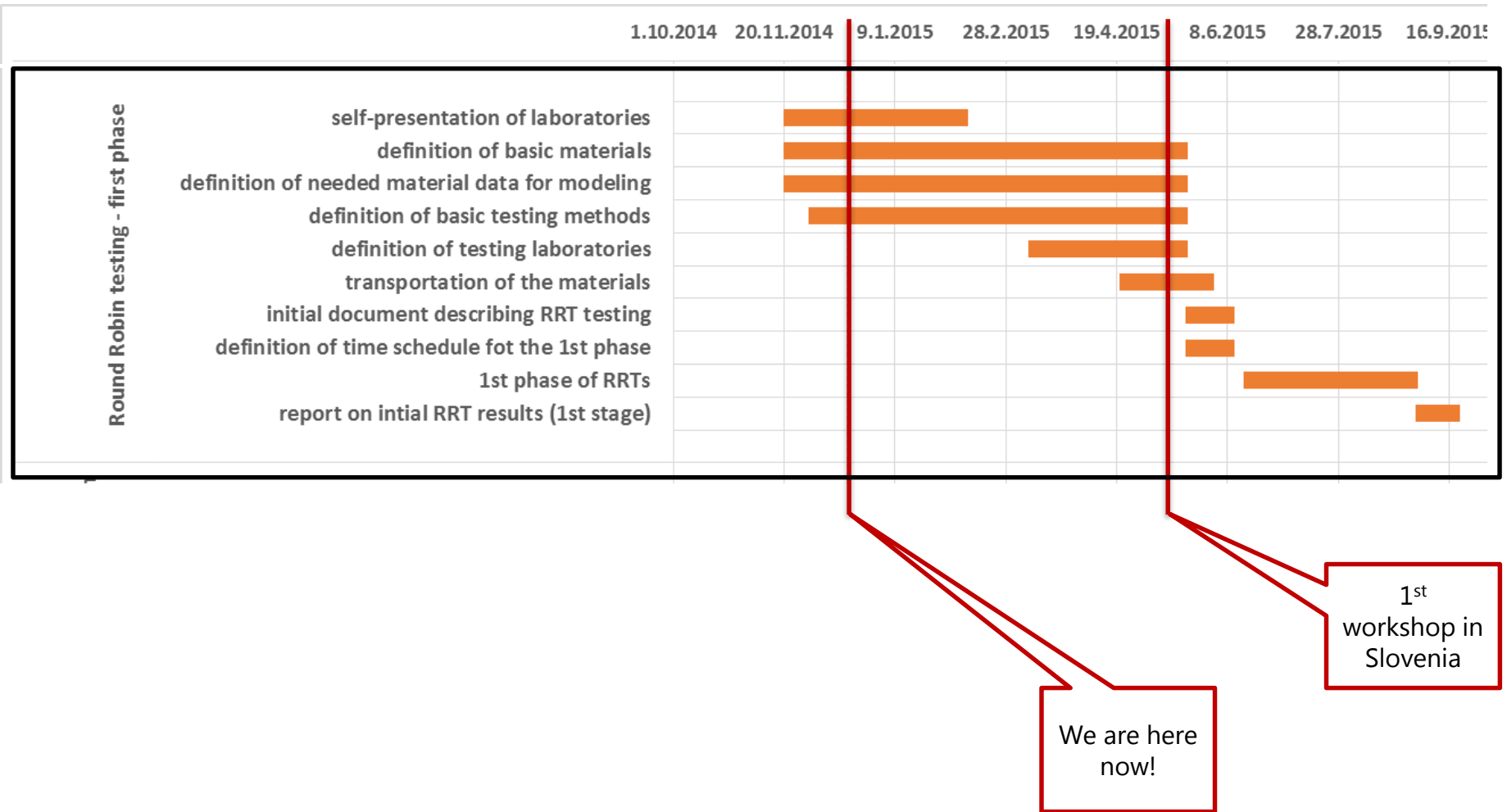


We are here now!

1st workshop in Slovenia

CONCREEP in Austria, 19.-20.9.2015

Gantt diagram (draft) – 1st phase of RRT



To do (in the near future)...

- MC members should contact the WG leader for GP leadership manifestation of interest within 2 weeks
- **to fill the «Call for WG Members» form** in order to indicate your interests in participating in RRT
- to prepare a short presentation of your interests and experimental facilities to be presented at our 1st workshop (in April)
- to define basic materials, test methods, and material data needed for WG2
- to define testing laboratories (on the basis of «Call for WG members» form and presentation of labs),
- to choose the most economical procedure for transportation of the materials,
- to organize 1st workshop (in April)
- to prepare initial document describing RRT procedure,
- to perform 1st phase of RRT (in order to obtain initial RRT results)
- to organize 2nd workshop (in September)

Thank you for your attention.