What new can the COST FP1006 Round Robin test provide to our knowledge on wood weathering?

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Objectives of the RR test:

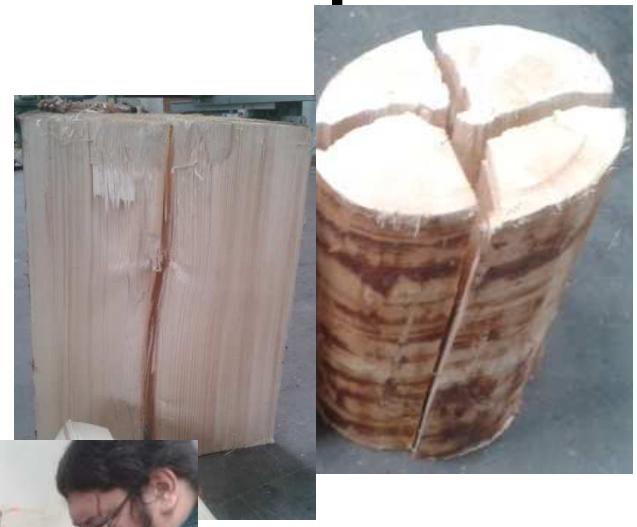
Scientific:

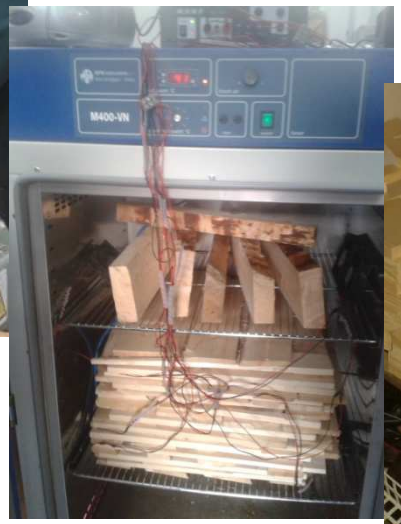
- to generate set of samples naturally weathered in different climatic conditions
- to collect set of parameters characterizing naturally weathered samples in different conditions and different periods of exposition
- to compare measurement procedures in laboratories involved in the test

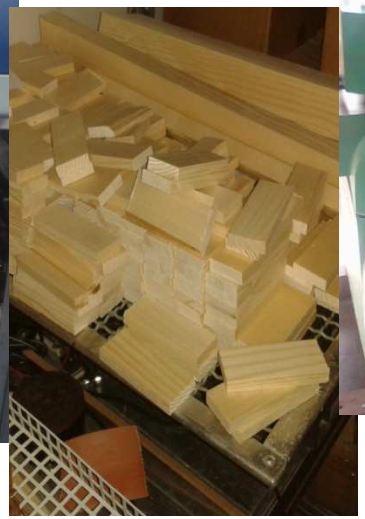
Collaborative:

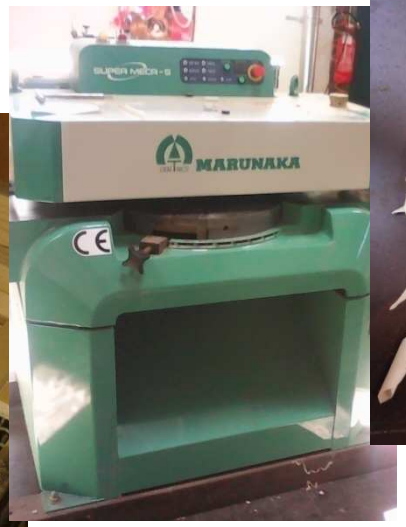
- to exchange experiences, methodologies
- to stimulate collaboration between COST Action members
- to provide bases for further common projects

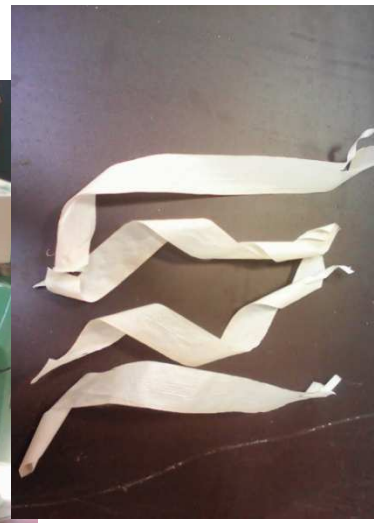
Experimental samples





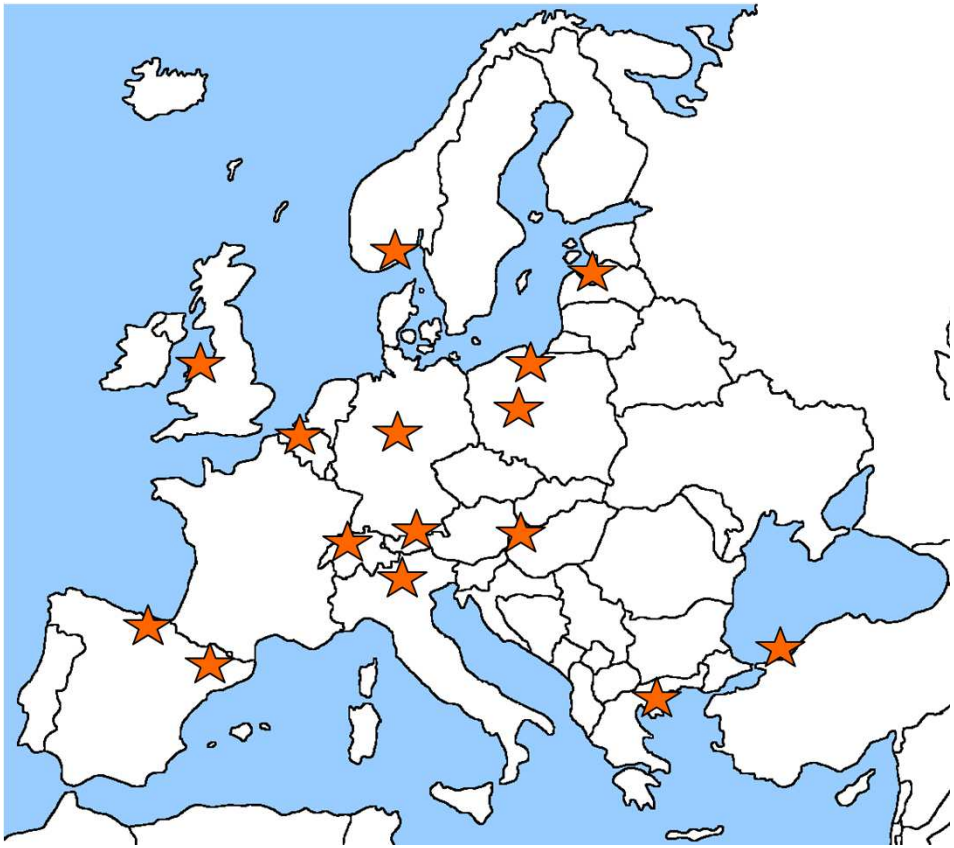


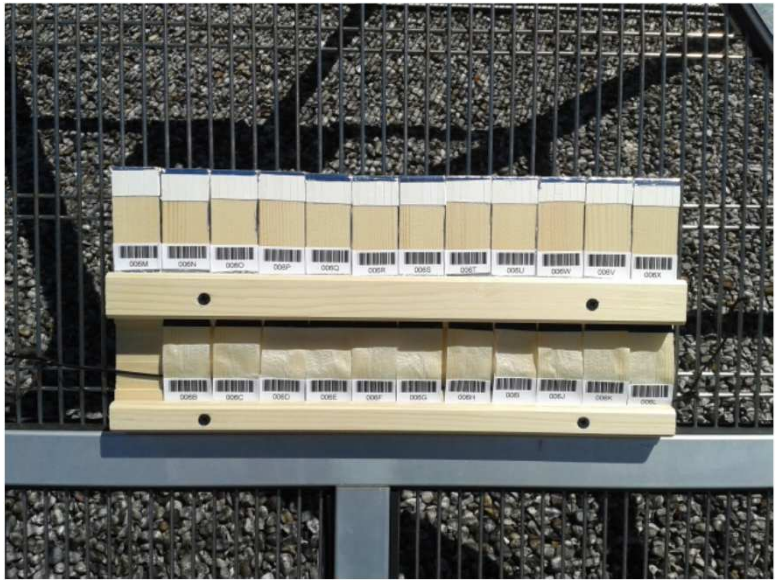




one piece of Norway spruce (*Picea abies*)
slicing planner - marunaka
the thickness of samples ~100µm (5mm)
the efficient surface 30 x 30mm
conditioned in 20°C, 60%RH

Experimental set-up

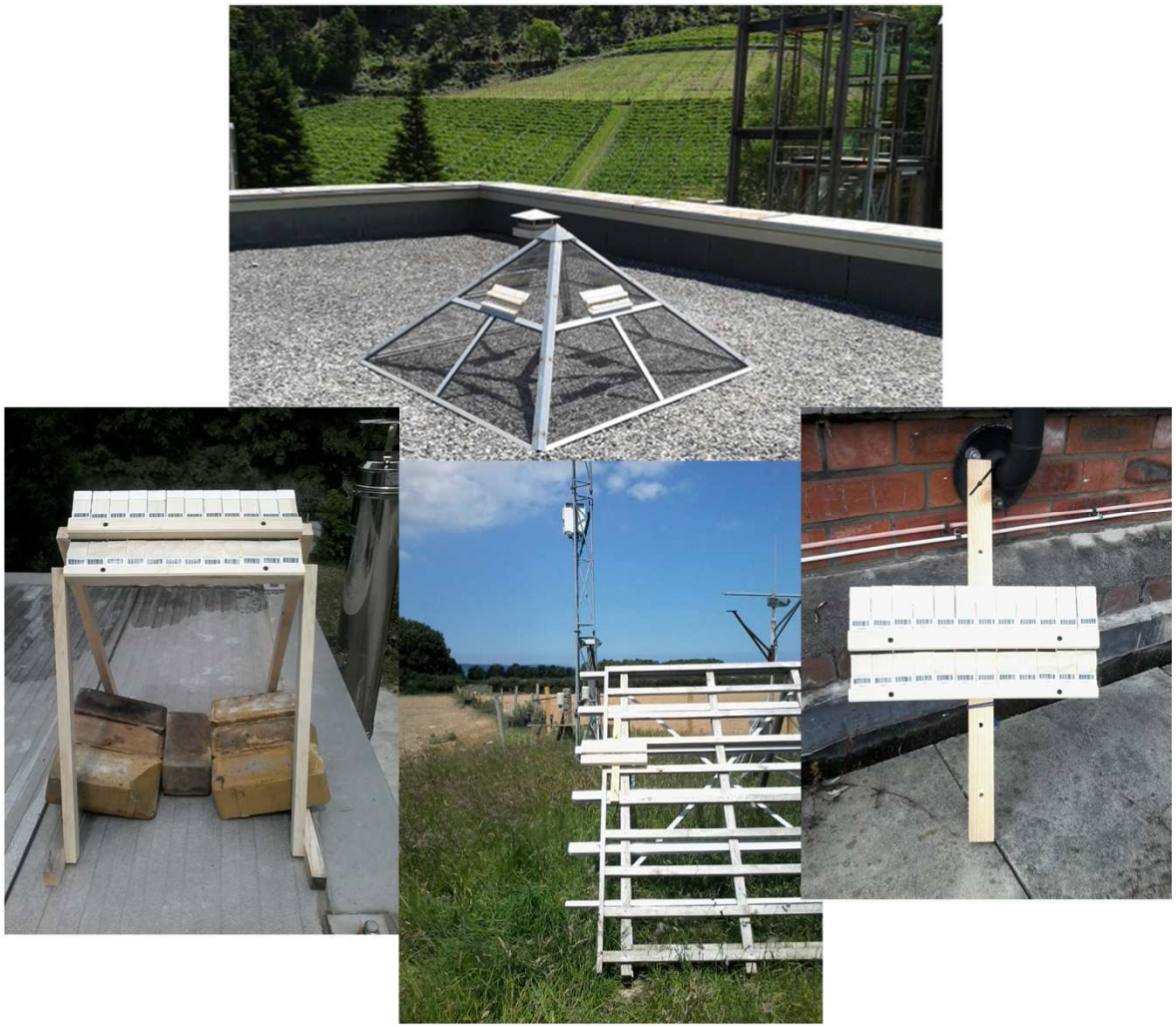




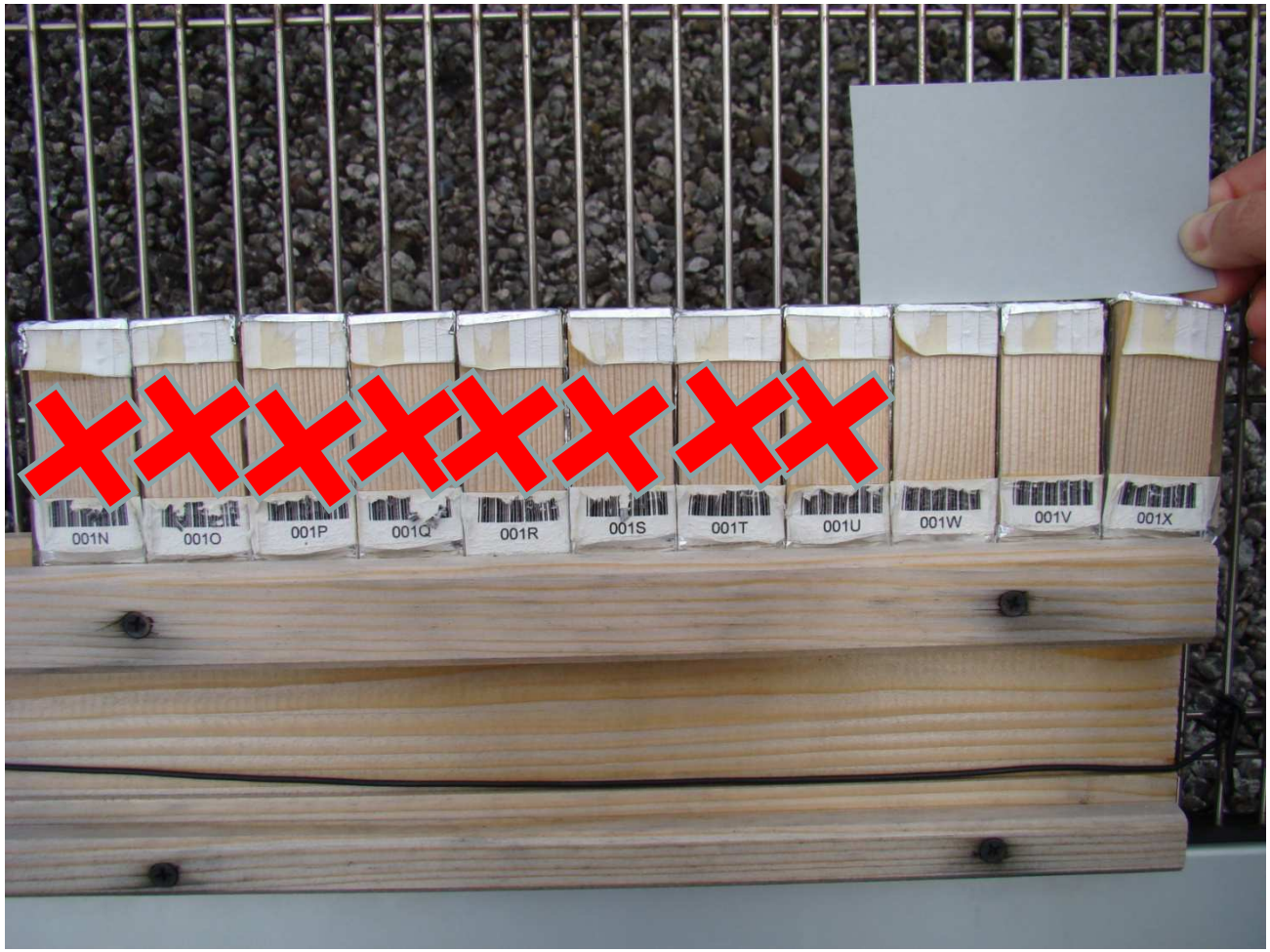
29 sets of samples were exposed in different countries in Europe (+Brasil)

- Short term weathering sample were collected at 0, 1, 2, 4, 7, 9, 11, 14, 17, 21, 24 and 28 days of weathering
- Long term weathering were collected each month during 1 year period

Sample presentation

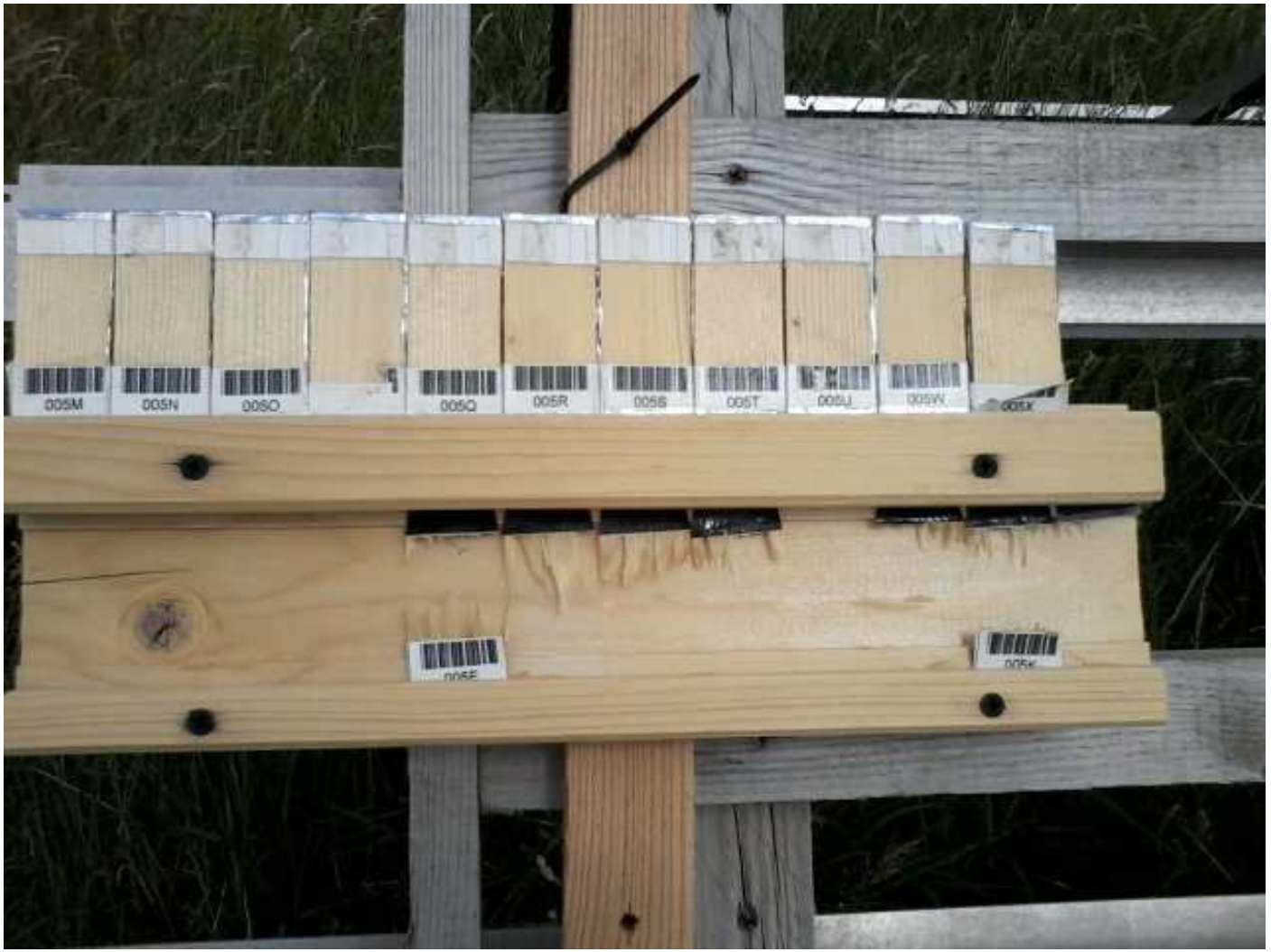


Current state



act of vandalism... ☺

the local soccer team has lost the game???



Four working groups were erected within the RR test participants (Dec 2014):

- **WG1: Characterization of samples,** to characterize the whole set of samples with methods available at IVALSA/CNR and to prepare samples for optional tests
- **WG2: Exploring climate data,** to unify all weather data provided by partners, to process the weather data and to data mine of weather data
- **WG3: Understanding the weathering process,** to collect all the available info about the degradation process of weathering and provide scientific bases for understanding of the RR test results (models).
- **WG4: Summary of Round Robin test and numerical models describing changes to wood,** to combine all the available info provided by WG1 and WG2 by means of multivariate analysis, to explain the results with support of the knowledge base developed within WP3, to build numerical models simulating wood weathering

surface characterization methods applied on the weathered samples:

- **Color CIE Lab** (DONE! also as Round Robin test #2)
- **VIS, NIR and MIR spectra** (DONE!)
- **Imaging** (DONE!)
- **Gloss** (DONE!)
- **XRF** (for long term weathering)
- **roughness** (for long term weathering)

It is also foreseen that the same set of samples will be evaluated by interested partners with alternative techniques including:

- **Microscopy**, (DONE! STSM COST FP1303 – **thanks to Marion!!!**)
- **NIR hyperspectral imaging** (DONE! STSM COST FP1001 – **thanks to Ingunn and Lone!!!**)
- NMR, Pyrolysis-GC-MS, Elemental composition, Micro-CT, Surface tension, TGA, Micro-tensile testing, DMT (**STSM scheduled for May 2015**)

Other ongoing activities

1. Exploring weather data: *weather index or dose based on real historic data specific for each sample set* (**special thanks for Ingunn and Thomas!!!**)
2. Better understanding of weathering mechanisms: *including literature review and development of the weathering progress indicator*
3. Model weathering progress on the base of RR test data (*asethetical and physical-chemical aspects*)
4. Use of the new know-how in the “real world” applications: *please see the poster “Simple surface climate models for modeling weathering effect on wooden surfaces” by Thomas*

Summarizing…

- The set of results collected up-to-date has been used for determination of the degradation degree due to exposure time and geographical locations.
- Original approaches for quantification of the weathering progress and the weather dose were developed and reported in this conference.
- **The work is still ongoing and you are welcome to contribute!!!**

Special thanks for COST Action FP1006

- For support of "**NIR&Wood – sounds good**" workshop (April 2014)
- For support of **Focused Working Group Meeting** in San Michele (December 2014)
- For support of Round Robin test **logistics**
- but most of all for an opportunity to create the "**RR test network**"