



**Enhance mechanical properties
of timber, engineered wood
products and timber structures**

COST Action FP1004

Start date: 30/05/2011

End date: 29/05/2015

Year: 2

Professor Richard Harris

Chair

The University of Bath / UK



Scientific context and objectives

- Various forms of strength enhancement through reinforcement have been considered in research, this COST Action considers work that will benefit from technology, which is available worldwide but is not being completely exploited in structural design and construction
- **MoU main objective:** The main objective of this Action is to enhance the performance of structural timber products and structures and thereby improve the competitiveness of timber structures.

Scientific context and MoU sub-objectives (1/2)

- A state-of-the-art report and a best practice guide on how to achieve enhanced properties of wood-based products and improve the performance of connections and timber structures – **More than 200 projects presented and recorded on PowerPoint and pdf and available on Action Website. Proceedings of Zagreb Conference. Further S-o-A publications planned**
- Summarise and explain various novel modelling techniques for weak zones in timber structures and improve the performance of these structures – **Workshop 1 Presentations**
- Improve maintenance of existing timber structures and make them fit for purpose future use (residual strength, methods of strengthening and ductility of strengthened components) – **cooperation with COST Action FP1101**
- Optimise collaboration of scientists and engineers in the field of timber structures, exchange information on national ongoing projects and future research programmes – **3 conferences and more planned**
- Provide new network constellation for collaboration within ongoing projects financed by various national bodies – **3 conferences and more planned**
- Exchange students, post docs and research activities through short-term scientific missions – **12 STSMs so far (9 completed)**
- Provide combined information and disseminate the most up-to-date results to the industry, code writers, policy makers and society – **1 Training School and 3 conferences and more planned**
- Contribute to the improvement of design codes (revision of Eurocodes within 5 years) – **WG1 initiative**



Scientific context and objectives (2/2)

- **Research directions (from the MoU):**
- More efficient use of screws and rods in enhancement of new and existing structures – **Year 3**
- Methods for adoption of glass fibre reinforced polymer (GFRP) in timber enhancement – **Year 3**
- Consolidation of knowledge in use of cross laminated timber – **Graz Conference (May 2013)**
- Identification of the potential of different types of connections and reinforcements in terms of ductility and energy dissipation – **STSMs (ongoing)**
- Bases for documented design solutions of timber bridges and for contributing to further development of timber design rules – **Wroclaw and CIB-W18**
- Dissemination of knowledge about techniques for enhancing the mechanical performance of timber-based structures and thereby improves their competitiveness and industrialisation to student and professional engineers – **Lund Training School (and other activities)**



Working groups

The work Groups in this COST Action do not work in isolation. They lead themes and collaborate in execution of strategy and in fulfilling objectives

WG1 - Enhance performance of connections and structural timber in weak zones. **Leading on bring bonded rods towards codification. Lead on Wroclaw Conference and presentation to CIB-W18**

WG2 – Enhance the mechanical properties of heavy timber structures with particular emphasis to timber bridges. **Expected to lead in the Cross-Laminated Timber initiative (Graz Conference and publication)**

WG3 – Modelling the mechanical performance of enhanced wood-based systems. **Brings together analytical aspects of all enhancement**
All Work groups: More efficient use of screws and rods in enhancement of new and existing structures – Year 3



Results vs. Objectives

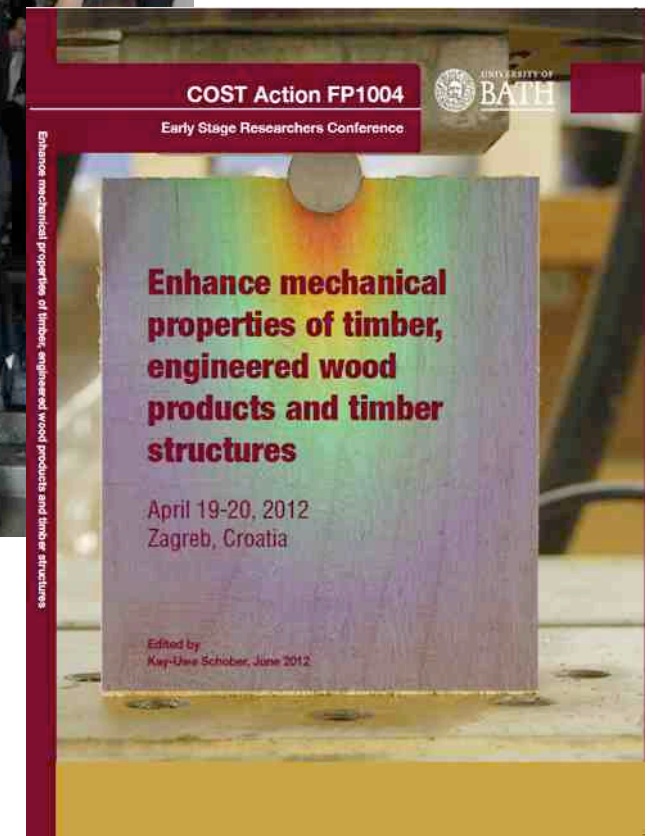
Research directions (as presented in Copenhagen):

- Network of experts for collaboration
 - 27 countries participating
- Development and publication of state-of-the art work
 - Country presentations on website (more than 200 research projects from more than 20 countries)
 - Published proceeding from Wroclaw conference
- Courses and seminars for dissemination
 - Lund Training School
- Contribute to the improvement of design codes
 - Output from Wroclaw – follow-up to CIB-W18

Significant Highlights in Science and Networking - 1

Zagreb ESR Conference

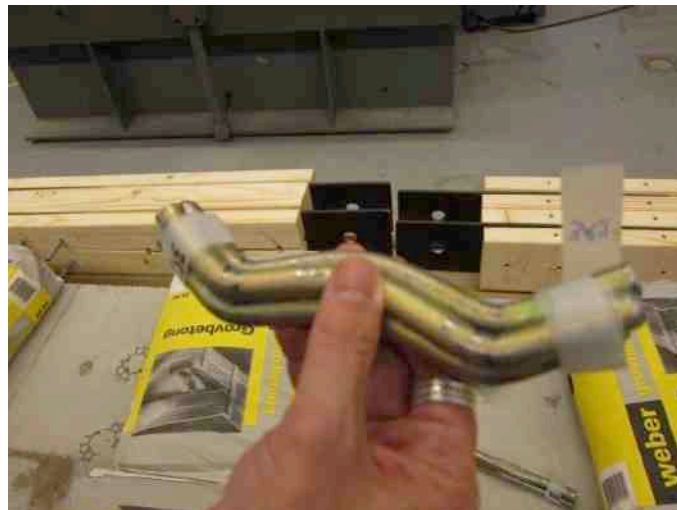
- WG1, WG2 and WG3 themes
- Early Stage Researchers strongly encouraged to participate
- 47 participated (28 ESRs)
- 40 papers were presented by 37 presenters (33 by ESRs)



Significant Highlights in Science and Networking - 2

Training School

- Lund University School of Civil Engineering
- 24 COST Action FP1004 trainees from
- 13 different countries,
- Highly expert trainers (5 of whom are COST Action FP1004 MC members)
- preparation and testing of timber specimens reinforced with screws formed the lab work.





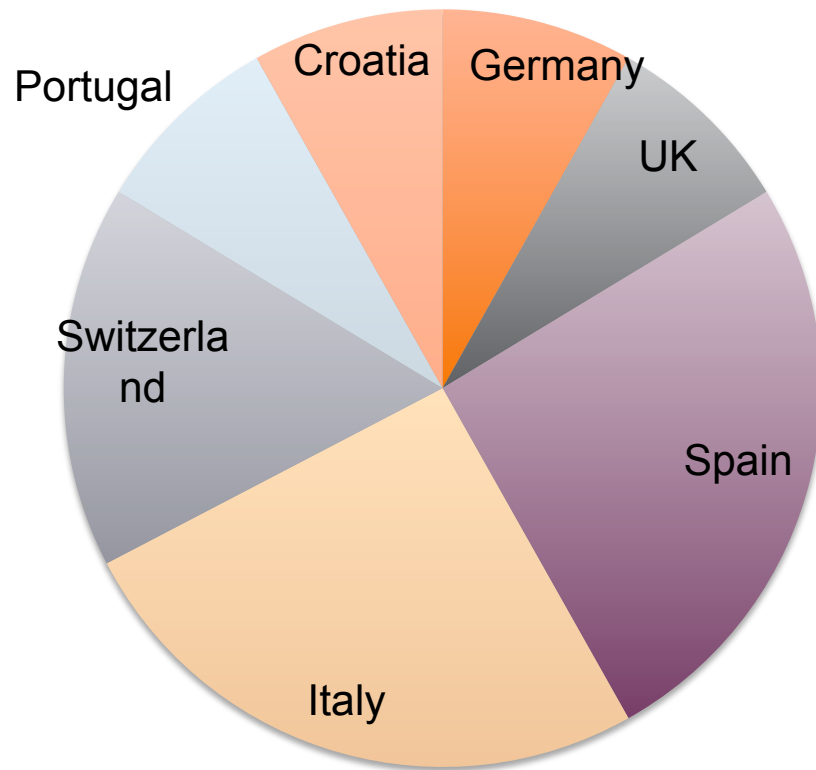
Challenges

- No significant deviations.
- **The recession presents a big challenge –hard to get new research funding. COST Action is very important in maintaining momentum**
- CLT – Hosting significant Conference in Graz and publishing State-of-the-Art review
- Bonded rods – presentation to CIB-W18. Challenge of maintaining momentum in an environment resistant to change
- Broadening scope to screws and other forms of dowel reinforcement – carrying success of Year 2 into Year 3

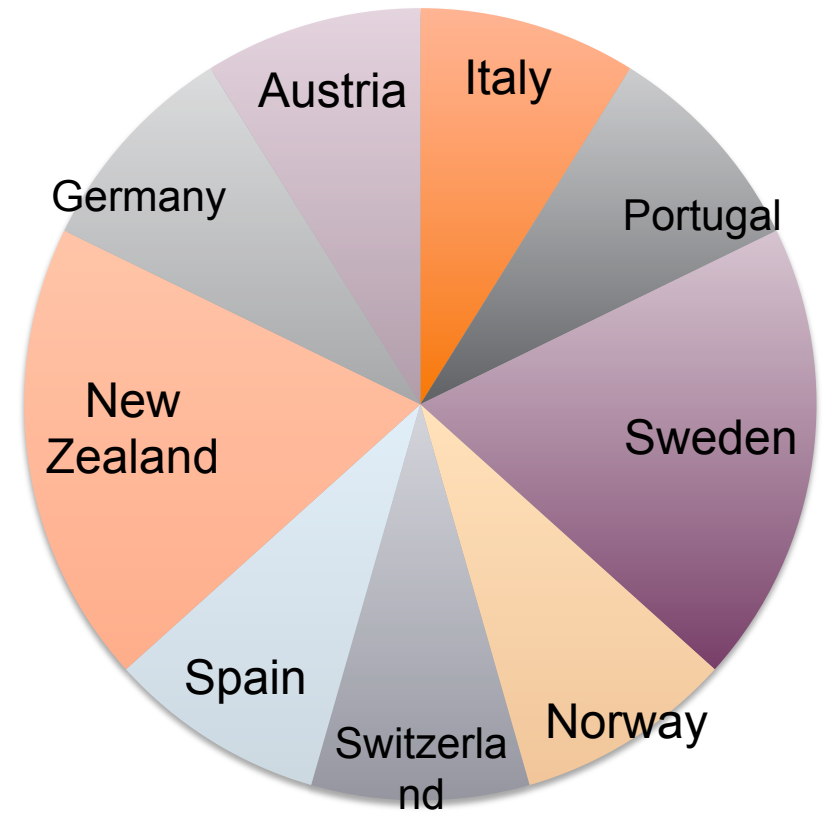


STSMs – 12 so far

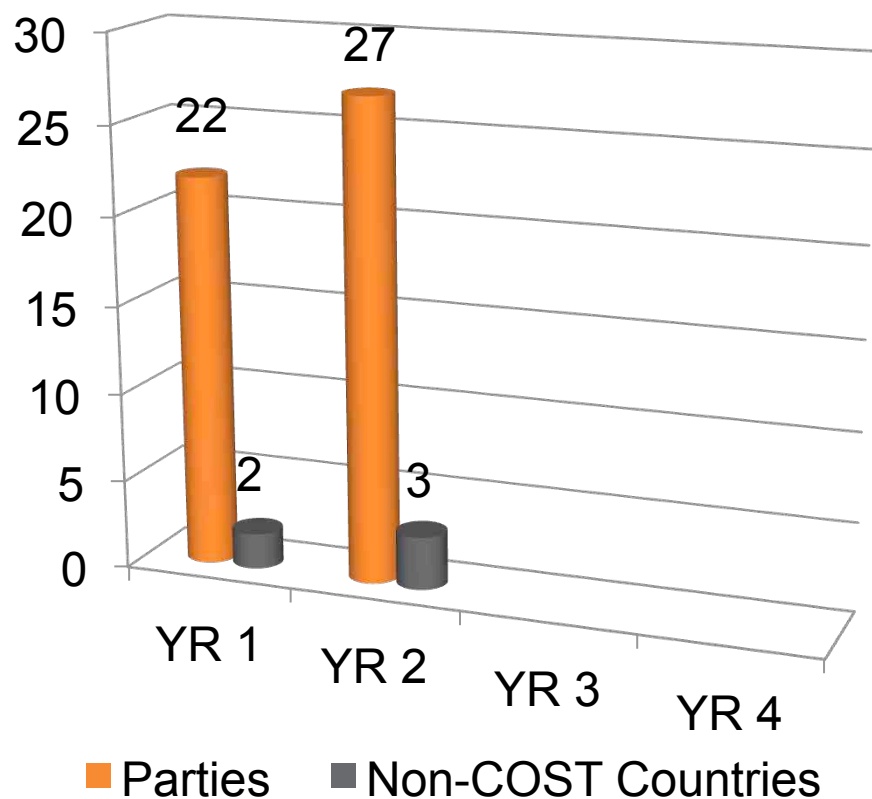
From



To



Action Parties



Grant Holder:

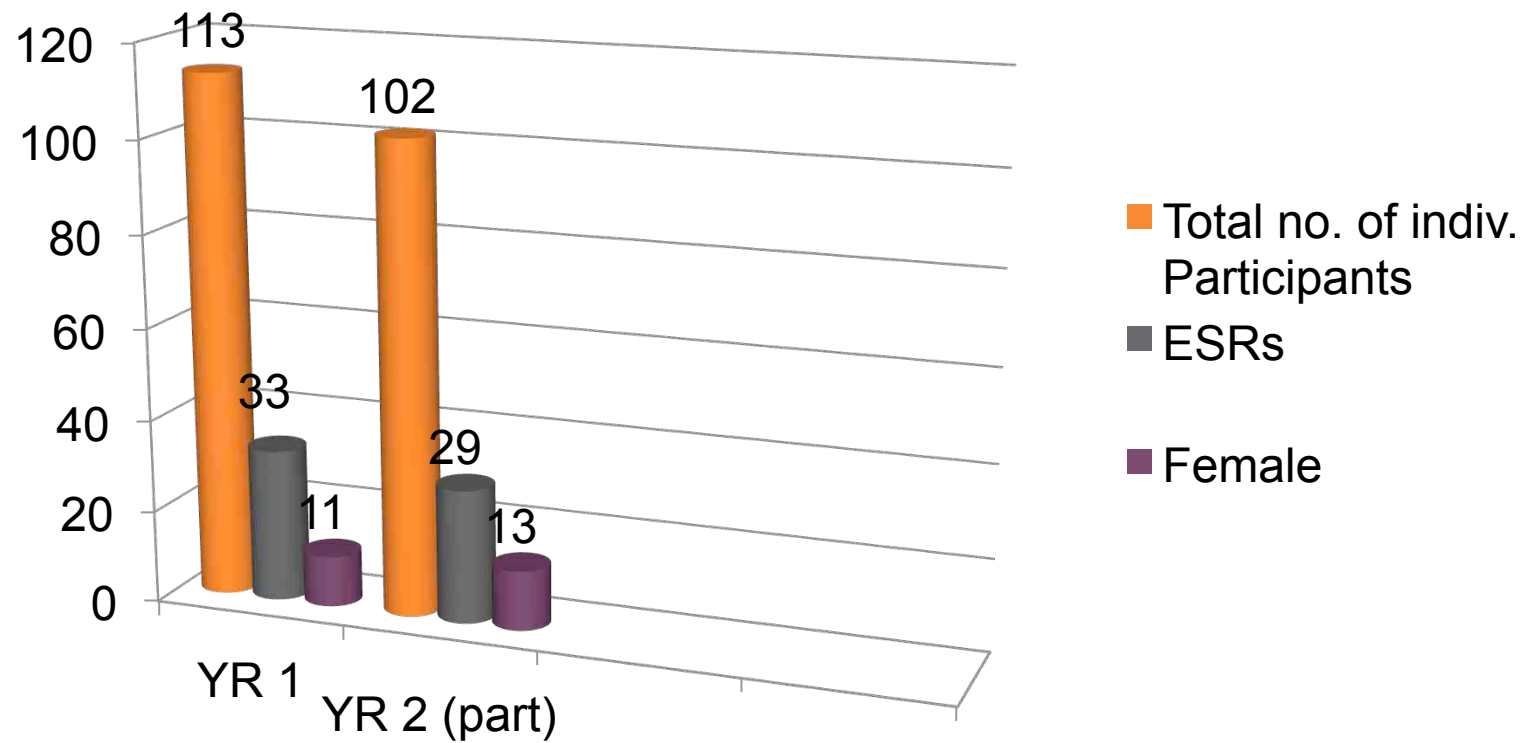
The University of Bath

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United Kingdom



Action participants





Use of COST Instruments

Activity (No.)	Year 1	Year 2	Year 3	Year 4
MC/WG Meetings	1	2 (1 so far)	-	-
STSMs	6	6 (3)	-	-
Training Schools	0	1	-	-
Workshops or Conferences	2	2 (1)	-	-
Joint Publications	1	1 (0)	-	-