

Action FP1004

2011 - 2015

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

Participating countries: AT, BE, BG, CH, CZ, DE, DK, EL, ES, FR, FI, HR, IT, IE, LT, MK, NL, NO, PL, PT, SE, SI, TR, UK

Chair of the Action: Richard Harris, UK, R.Harris@Bath.ac.uk

COST Science Officer: Xin-Ying Ren, XinYing.Ren@cost.esf.org

www.cost-xx.com

FPS



Figure 1: COST Action Fp1004 Logo.

Working Group 1: Enhance performance of connections and structural timber in weak zones

WG1 will focus on the structural behaviour of timber and connections in weak zones and how to improve/enhance performance and reliability. This scientific area includes:

- Identifying and categorising weak zones (type of failure, relevance) and respective mechanical properties
- Grouping of connections (load level, type of failure, dissipation of energy)
- Using glued-in rods or self-tapping screws as reinforcements
- Using densified wood or modified wood
- Using other Engineered Wood Products (EWP) e.g. plywood, LVL or cross-laminated timber (CLT) as reinforcement
- Using fibre reinforced polymers (FRPs) as reinforcement
- Evaluation of design models and identification of respective gaps
- Potential of non-destructive test (NDT) methods in identifying weak zones
- State-of-the art in reinforcing connections and weak zones
- New jointing techniques (in cross-laminated elements, or in components created with CNC machines (direct timber contact)

Working Group 2: Enhance the mechanical properties of heavy timber structures with particular emphasis to timber bridges

WG1 will focus reinforcing techniques used for heavy timber structures, in particular for timber bridges and how to improve/enhance performance and reliability.

- Identification of properties to be enhanced
- More effective timber decks as a result of effective pre-stressing
- Increase stiffness and strength by reinforcement
- Energy dissipation capacity of structures.

Working Group 3: WG3: Modelling the mechanical performance of enhanced wood-based systems

WG3 will focus on mechanical and structural behaviour of timber elements and systems with enhanced performance, by use of advanced numerical modelling and analysis.

- Identification and experimental determination of properties to be
- Material properties needed in numerical models
- Design and performance models of enhanced timber structure
- Static, dynamic, environmental, fire and accidental action
- All durations and including stability and large deformations
- Cracks parallel to the grain related to moisture content variations and different longitudinal shrinkage

Objectives:

- At meeting in Croatia in April 2012, key issues to be addressed a start of Action will be:
- WG1: Glued rods and screws for reinforcing weak zones and connections in timber
- WG2: Influence of connections on whole structure response in timber structures
- WG3: modelling of basic wood behaviour and of connections with glued in rods and self-tapping screws

Main Achievements

- Increased participation (17 participants at the start of the Action, these have been joined by 10 new parties, including three non-COST countries)
- Membership and objectives of Work Groups agreed
- Outline presentations by Action Parties on current research (approx. 140 projects presented, with single page summaries prepared as record)
- Seminar agreed for Croatia in April 2012. Summary papers invited. Preference to be given to ESRs in invitations