

Turkey



January 2014



COST FP1303: Performance of bio-based building materials



Participating Group 1; Physical and Mechanical Properties of
Bio-based Products

Participating Group 2; Wood Protection

Participating Group 3; Wood Chemistry and Bioenergy

TURKEY

Previous Activities

Physical and Mechanical Properties of Bio-based Products

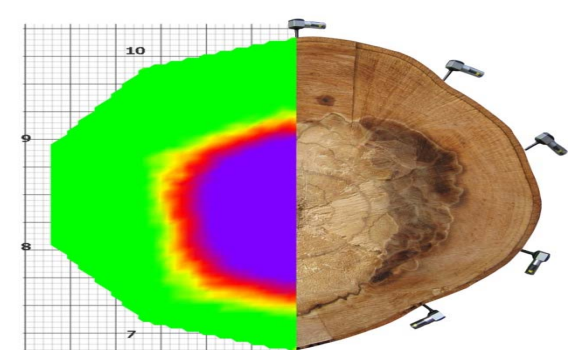
January 2014



Istanbul Univ

- The relationship between technological properties of various tree species determined by destructive test methods and nondestructive test methods (using acoustic tomography, stress wave and ultrasonic methods) (TUBITAK)**
- Effect of boron and phosphate compounds on physical, mechanical, and fire properties of wood–polypropylene composites
- Utilization Possibilities of Waste Paper Sludge as a Raw Material in Particleboard and Dry Process Fiberboard Manufacture
- Biological performance of wood- and bamboo-polypropylene composites: Effects of particle content, particle size and Zn borate

****TUBITAK: THE SCIENTIFIC AND TECHNOLOGICAL RESEARCH COUNCIL OF TURKEY**



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Previous Activities

Physical and Mechanical Properties of Bio-based Products January 2014



Karadeniz Tech Univ

- EMC of some species of painted and varnished wood in the use of Indoor Climate for constructions
- Chip Drying Temperature Effects on the Physical and Mechanical Properties of Particleboard
- Using different plastics and lignocellulosic raw materials for producing Wood-Plastic Composite Profile with Extrusion method

Kahramanmaras Sutcu Imam Univ

- Recycled plastic composites with high biomass content for profiles and panels designated to produce economical buildings (TUBITAK)
- Thermal Conductivity, Sound Insulation and radiation transmission of Cotton Waste, Fly Ash and Barite Reinforced Chipboards
- Mechanical Properties of Injection-Molded Foamed Wheat Straw Filled high-density polyethylene (Hdpe) Biocomposites: The Effects of Filler Loading and Coupling Agent
- Manufacturing biodegradable wood/polymer composites
- Manufacturing of wood-plastic composite foams: microcellular foaming and extrusion foaming
- Liquefaction of agricultural biomass wastes with polyhydric alcohols and its application to manufacture polyurethane type foams
- Manufacturing of isolation board from sunflower stalks



Istanbul U; Technological properties and resistance of layered timber (LVL) produced by coating impregnated with several FR chemicals

- Fire performance and decay resistance of solid wood and plywood treated with quaternary ammonia compounds and common fire Retardants
- Physical, mechanical properties, fire, decay, and termite resistance of treated OSB
- Remediation of CCA-C treated wood using chelating agents

Karadeniz Tech. U; Physical Properties of Beech wood treated with New Generation Water-based Micro-Emulsion System Formulations

Mugla U, COST- TUBITAK; Leaching performance and color stability under UV accelerated weathering conditions for wood surfaces that were treated with natural stain by ultrasonic assisted dyeing method

Bartın U; Determination of Wood Damaging Factors in the Western Black Sea Historical Houses (Possibilities of Prevention)

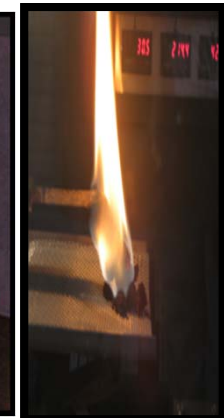
- Evaluation of wooden materials deteriorated by marine-wood boring organisms in the Black Sea
- MDF Manufacturing from Wheat Straw
- Effects of Tannin and Thermal Treatment on Properties of Laminated Chestnut WC



Duzce Univ; Determination of micro-mechanical properties of some wood species grown in Turkey and relationship with the value of standard dimension samples. Aim: Determine and compare mechanical properties of Pine and Oak wood using micro scale and standard dimension samples.



Bursa Technical Univ; Developments, performance and testing of Bio-based products, performance of modified engineered wood products with textile chemicals, fire resistant engineered wood products from fast growing wood species, wood-plastic composites from agricultural residues, fire resistant wood-plastic composites using boron compounds, fiberboard from recycled paper





Istanbul U; Use of acoustic emissions to control drying process of difficulty drying hardwood. Physical, chemical and microbiologic properties of composites produced from waste Tetra Pak

Karadeniz Tec.U; Development of advanced lignin-cellulose-composites with high impact properties for modular pallets and components for transport systems (LiLo – High Impact Lignin-Cellulose-Composites for Logistics) (COST TUBITAK)

- Thermal Conductivity of Press Time Optimization and Modelling with Artificial Neural Networks of Plywood Panels (COST TUBITAK)

- Plasma Modification and Improvement of Wood Adhesion and Bonding (TUBITAK)

Suleyman Demirel U; Fatigue properties of Turkish Red Pine Wood (TUBITAK)

- Light Skeleton Wooden Housing Construction Using Lumber and Wood Composites

- Wood Density and Annual Ring properties of standing Turkish Red Pine using Non-destructive Methods (COST TUBITAK)

Istanbul Tech U Archt; Application of Timber-Glass Composite Structures for Building Construction (WOODWISDOM-NET 2 Proj)

K.Sutcu Imam U; Liquefaction of agricultural biomass wastes with polyhydric alcohols and its application to manufacture polyurethane type foams

- Manufacturing of wood-plastic composite foams: microcellular foaming and extrusion foaming
- Manufacturing of isolation board from sunflower stalks

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On-Going Projects

Physical and Mechanical Properties of Bio-based Products

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Gazi U; Prefabricated Wood Building Design Towards Engineering Calculations Software

- Reinforced Wood Building Materials Production and Investigation of Aging Effects
- Reinforced Wooden Building Element Design and Determination of Some Technical Specifications



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Bursa Technical U; Properties of different boron compounds on Bio-based products, prevention of boron leaching from wood, effect of chemical modification on different wood species

Istanbul U; Using of Boron in wood and WPC as fire retardants

Bartın U, COST TUBITAK; Weathering performance of wood with impregnated with Copper azole and water repellent materials

Gazi Univ; Effect of Impregnation with Timbercare Aqua on the properties of some woods

Karadeniz Tech U, COST TUBITAK; Wood-Based Panels of the Volatile Organic Compound (VOC) Detection and Limitation

K.Sutcu Imam U, COST TUBITAK; Use of new environmentally friendly wood preservatives to increase the wood's service life

Kastamonu U; Extractive compounds of Olive and juniper woods, well known with their natural durability, and evaluating these compounds for wood protection//UV Tests on the Technological Properties of Heat Treated Wood Material

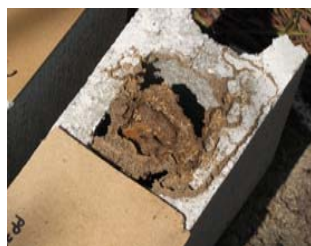
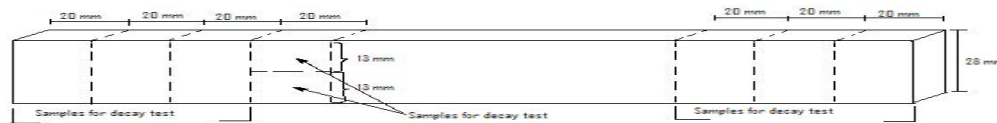
Karabuk U, TUBITAK; Computer-Aided Evaluation of Wooden Material Combustion Performance (Fuzzy Logic Graphical User)





Duzce University; Decay test; JIS K 1571, White rot: *Trametes versicolor* (L.:Fr.) Pilat (FFPRI 1030), Brown rot: *Fomitopsis palustris* (FFPRI 0507)

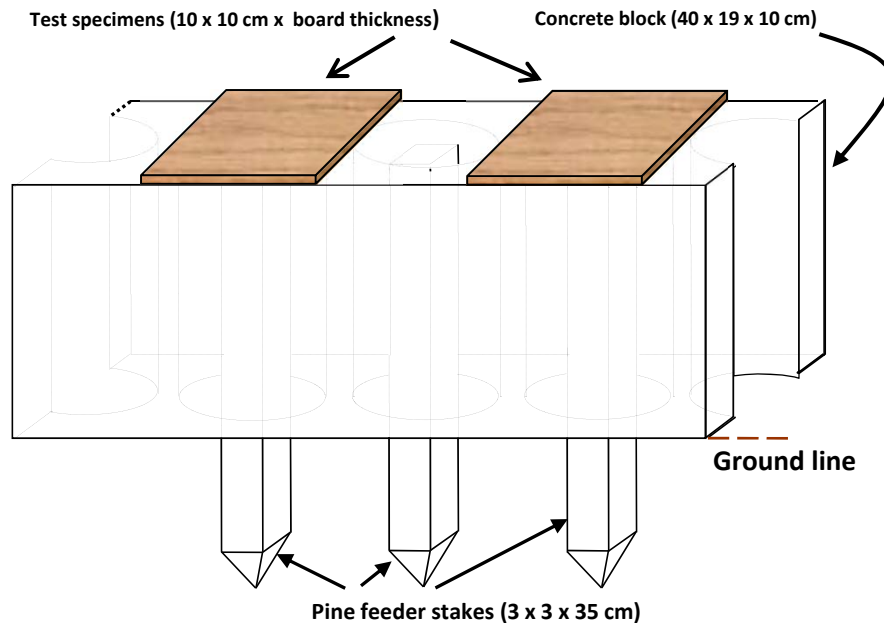
- Termite test; JWPS-TW-P.1, *Coptotermes formosanus* Shiraki
- *Post-treatment of WBC and In-line treatment of WPC*
- *Laboratory decay and termite tests of preservative treated and untreated WBC and WPC (in association with Kyoto University – RISH, Japan)*
- *Field tests of wood preservative treated and untreated WBC and WPC on protected above ground conditions (in association with Kyoto University, RISH, Japan)*



Mugla U, TUBITAK; Surface properties of impregnated and varnished Scots pine wood after accelerated weathering



Field tests



To simulate crawl space conditions in Japanese homes
AWPA Rating; 10 sound, 9 Trace of attack, 7 Moderate attack, 4 Heavy attack, 0 Failure, disintegration of specimen

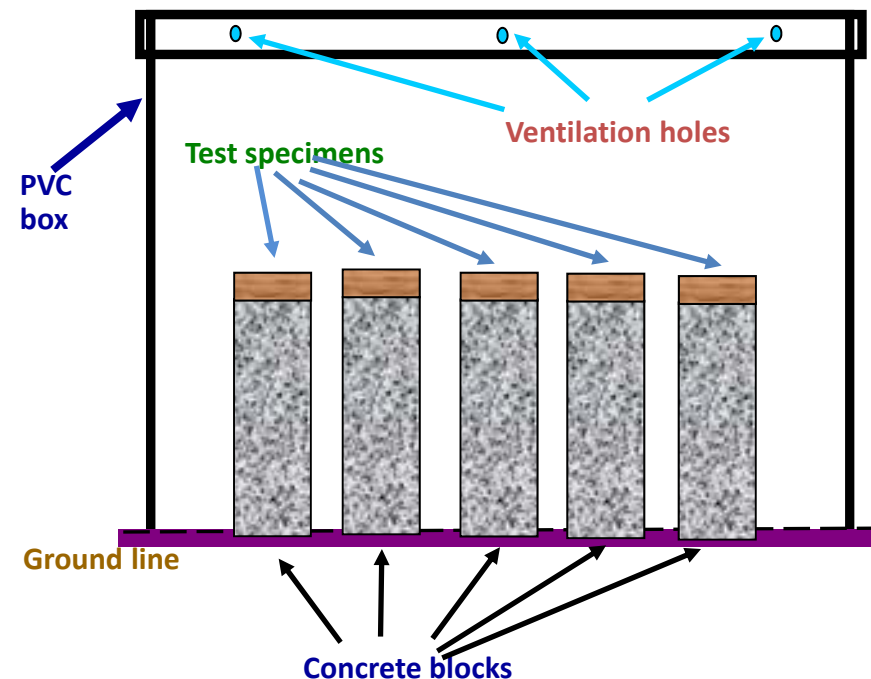
The Living Sphere Simulation Field (LSF) in Kagoshima Prefecture

Mean annual rainfall : 2265 mm

Mean annual temp.: 18°C

Scheffer's climate index: 90

C. formosanus, *R. speratus* and wood-rotting basidiomycetes are present.





Bursa Tech Univ; Non wood forest products, Bio-oil production from agricultural wastes and forest residues by pyrolysis, Polyurethane-type rigid foams from liquefied wood, utilization of paper mill wastes for bio-composite

- The combined effects of boron and oil heat treatment on beech and Scots pine wood properties. Boron leaching, TG analysis, and chemical composition

- Effect of accelerated aging on physical and mechanical properties of bamboo

K. Sutcu Imam U; Pyrolysis of laurel (*Laurus nobilis* L.) extraction residues in a fixed-bed reactor: Characterization of bio-oil and bio-char

K. Sutcu Imam U and Karadeniz Tech U; Removal of methylene blue from aqueous solution using cotton stalk, cotton waste and cotton dust



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Specialist equipment

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Duzce University;

- Laboratory decay equipment (Interlaminar flow bench, inoculation chambers, autoclave, liquid media preparation equipment)
- Wood preservation facility (Full size and experimental size pressure treatment chambers)
- Analytical Tools for chemical analysis (Varian AA 240 Atomic Absorption Spectrometer)
- Field tests for termite and fungal activity (in association with Kyoto University, RISH)

Kahramanmaras Sutcu Imam University;

Co-rotating twin-screw extruder, essential oil, cleverger, LOI (Limit Oxygen Index) ,Piroliz, TGA (Thermo Gravimetric Analyze), HPLC, Spectrophotometer (UV), Thermal Conductivity, DSC, GC (FID) analysis, AFM, Strand,

Bursa Tech Univ ; Artificial weathering chamber; IR-spectroscopy; Microscopy and image analysis lab.; formaldehyde emission chamber; combustion experiments, flame chamber; pyrolysis unit ,mycology lab

Bartın Univ; QUV/spray Weathering, Colour glossiness, FTIR, HPLC, GC/MS, Color Brightness Tester, UV Spektrometer, particle and fiber dryers

Gazi Univ; Painting tests, laminated wood prodcs testing



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Istanbul U; Nondestructive Evaluation,
Acoustic tomography, Ultrasonic timer, Tree sonic,
Acoustic emission, FFT analyzer, microsecond time,
Dynamic mechanical analyzer TGA

Karadeniz Tech U; Plasma Surface Modification
(DIENER), Contact Angle Measuring (Kruss), Thermal
Conductivity Measur (LaserComp), Surface
Roughness Tester, UV spectrophotometers ,
Formaldehyde Emissions (1 m3 cabin, Perferat,
Bottle, Desiccator method), Adhesion Tester(Pull of
strength), Varnish film thickness measur





INSTITUTE	Properties						Environmental				
	Natural Durability	Moisture / sorption studies	Resistance to mould	Fire resistance / reaction to fire	Insect /termites / pests	Dimensional stability	Life Cycle Assessments	Whole Life evaluations	Product accreditation	Emission testing	Environmental Product Declaration (EPD)
ARTVIN CORUH UNIVERSITY	X	X				X				X	
BARTIN UNIVERSITY	X	X		X		X					
BURSA TECH UNI	X	X		X		X				X	
DUZCE UNIVERSITY	X	X			X	X					
GAZI UNIVERSITY	X	X		X		X			x		
ISTANBUL UNIVERSITY	X	X		X	X	X				X	
K.SUTCU IMAM	X	X		X		X	X				
KARABUK UNIVERSITY	X	X		X		X	X				
KARADENIZ TECHNIC UNIVERSITY	X	X		X						X	
KASTAMONU UNIVERSITY	X	X		X		X				X	



INSTITUTE	Laboratory tests						Field tests				
	Natural Durability	Mould resistance	Insect /termite testing	Leaching / weathering	Sorption studies	Dimensional stability	In ground contact tests	Out of ground contact tests	Natural weathering	Surface performance / coatings	Moisture data logging
ARTVIN CORUH UNIVERSITY	X					X					
BARTIN UNIVERSITY	X			X	X	X	X	X	X	X	X
BURSA TECH UNI	X			X	X	X	X	X	X		
DUZCE UNIVERSITY	X		X	X	X	X		X		X	
GAZI UNIVERSITY	X			X	X	X				X	
ISTANBUL UNIVERSITY	X		X	X		X			X	X	
K.SUTCU IMAM	X			X		X					
KARABUK UNIVERSITY	X			X	X	X			X	X	
KARADENIZ TECHNIC UNIVERSITY	X			X		X					
KASTAMONU UNIVERSITY	X	X								X	