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Involvement in the COST Action: Member of MC, Chair of WG1

Research interest

Holzforschung Austria’s division „Surface and Furniture“ focuses on the properties of surfaces and coatings of wood in interior and exterior applications. Coatings for sidings, balconies, fences, deckings, wooden windows, wood-aluminium windows, doors, furniture, wooden floors and wall and ceilings claddings are covered.

R&D projects are being carried out in order to develop transparent coating systems for wood in exterior applications (Brightwood Project), as well as making use of new nano technology to gain surface hydrophobicity of wood as well as technical processes for achieving greying of wood surfaces (Greywood Project)

In the field of wooden windows the aim for coatings is to optimize the moisture management in wooden windows by means of coatings and other measures, to develop coating systems for protected window designs (wood/aluminium window) as well as concepts for care, maintenance and repair of coatings.

The main focus of work on coatings for wood sidings and balconies lies on the weathering resistance, the maintenance and repair as well as on the influence of coatings on the moisture management in wood structures (e.g WoodExter Project). In this context, recommendations are also given for the selection of coating systems and on how to consider coatings in calculations pertaining to building physics.

For furniture surfaces research focuses on the chemical resistance of furniture coatings and the prevention of colour changes due to photochemical reactions on wood surfaces.

In the field of wood flooring for sealing materials as well as for wood surfaces finished with oils or waxes, criteria were developed for ensuring quality, the resistance against wheels of castor chairs and the lateral adhesion between flooring elements. Research activities combine technical criteria with haptics and health aspects of wooden flooring including assessment of emissions of volatile organic compounds (VOC). Major factors influencing temperature sensitivity and a comfortable feel of surfaces were elaborated as well as the effect of care and methods to repair damaged surfaces.

Specialized technique available in my lab

- Site for natural weathering and laboratory equipment for artificial weathering (QUV/Xenon)

- Laboratory for microscopy (incident and transmitted-light microscopy, measuring microscope, various methods of sample preparation, digital image processing)
- Scanning electron microscope with energy dispersive X-ray analysis (SEM-EDX-Analysis)
- FTIR (Fourier Transform Infrared Spectroscopy with ATR and DRIFT Unit)
- Equipment for application of coatings (brushing, dipping, air gun spraying, airless spray painting, airmix spray painting)
- Chamber for exposure to different climates
- Microwave tunnel
- Xenon-Suntester
- Equipment for testing abrasion resistance, scratch resistance, flexibility
- Instrument for colour and gloss measurement
- Equipment for contact angle measurements
- Spectrophotometer with integrating sphere for the detection of diffuse radiation
- Determination of pH values
- Gas-phase chromatograph with various detectors (FID, ECD and MSD) for the selected analysis of organic substances
- ICP – OES for the analysis of inorganic compounds in wood, soil and water matrices
- Identification reagents
- Microbiology laboratory (PCR - Polymerase Chain Reaction) DGGE - Denaturing Gradient Gel Electrophoresis, t-RFLP - Terminal_restriction_fragment_length_polymorphism, molecular cloning und sequencing)
- OCO-OES for the analysis of inorganic components in wood, soil or water matrices
- VOC (volative organic compounds): emission chamber and headspace-sampler

Current publications:

- Grüll G, Anderl T, Teischinger A (2004) Wood moisture content of coated wood/aluminium windows, Part 1: Reactions to exterior humidity stress. Surface Coatings International Part B: Coatings Transactions 87, B2:111 - 119
- Grüll G, Anderl T (2004) Wood moisture content of coated wood/aluminium windows, Part 2: Reactions to interior humidity stress. Surface Coatings International Part B: Coatings Transactions 87, B3: 203 - 210
- Grüll G, Anderl T, Schweiger I (2005) Wood Moisture Content of Coated Wood/Aluminium Windows During Three Years of Natural Weathering. Holz Roh Werkstoff 63, 334-341
- Grüll G, R Fitl, A Teischinger (2006): Computer Modelling of Steady-State Moisture Diffusion Through Wood/Aluminium Windows with Different Coatings. Surface Coatings International Part B: Coatings Transactions 89, B2, 99-192
- Forsthuber B, Grill G (2010): The effects of HALS in the prevention of photo-degradation of acrylic clear topcoats and wooden surfaces. Polymer Degradation and Stability, 95, 746-755.
- Grüll G, Truskaller M, Podgorski L, Bollmus S, Tscherne F (2011): Maintenance procedures and definition of limit states for exterior wood coatings. Eur. J. Wood Prod., 69, 443-450.
- Grüll G, Podgorski L, Truskaller M, Spitaler I, Georges V, Steitz A (2010): Performance of selected types of coated and uncoated modified wood in artificial and natural weathering. International Research Group on Wood Protection, IRG/WP 10-40510.

- Grüll G, Truskaller M, Podgorski L, De Windt I, Bollmus S, Suttie E (2010): Moisture Conditions in Coated Wood Panels During 18 Months Natural Weathering at Five Sites in Europe. Proceed. 7th Woodcoatings Congress, PRA, Hampton
- Grüll G, Truskaller M, Podgorski L, Georges V, Bollmus S, Jämsä S et al. (2010): WOODEXTER Work Package 3 - Interaction of wood and coatings – effect on the performance of wood products - Report on Laboratory Results. HFA-Report No. FFG 436, Holzforschung Austria, Vienna.
- Grüll G, Truskaller M, Tscherne F (2010): Wartung von beschichteten Holzbauteilen - Leitfaden zum Erkennen des richtigen Wartungszeitpunktes. Holzforschung Austria – Magazin für den Holzbereich, 03.2010, 10-11.
- Truskaller M, Grüll G, Bollmus S (2010): Comparison of wood moisture content in coated panels of selected types of modified wood during natural weathering. Poster. Proceed. European Conference on Wood Modification (ECWM), Riga.
- Grüll G, Spitaler I, Truskaller M (2011): Moisture protection and performance during 5 years exposure of 19 wood coating systems on a cladding in Vienna. International Research Group on Wood Protection, IRG/WP 11-40561.
- Podgorski L, Grüll G, Truskaller M, Lanvin J D, Bollmus S (2011): Wet and dry adhesion of coatings on modified and unmodified wood: influence of 18 months of natural weathering on the pull-off test and cross-cut test results. International Research Group on Wood Protection, IRG/WP 11-40569.
- Podgorski L, Grüll G, Georges V, Truskaller M, Bollmus S (2011): Coating performance on different types of modified wood: natural and artificial weathering results. Surface Coatings International Part B: Coatings Transactions, 4, 139-150.
- Thelandersson S, Isaksson T, Frühwald E, Toratti T, Viitanen H, Grüll G et al. (2011): Service life of wood in outdoor above ground applications - Engineering design guideline. Lund University, Div. of Structural Engineering (Report TVBK-3060).
- Thelandersson S, Isaksson T, Suttie E, Frühwald E, Toratti T, Grüll G et al. (2011): Service life of wood in outdoor above ground applications: Engineering design guideline. Background document. Lund: Lund University, Div. of Structural Engineering (Report TVBK-3061).