

Learning Resources

Module List



Timber as a material	Environmental aspects of wood	Introduction to timber engineering design	Further topics in timber engineering
Introduction – why choose timber? <ul style="list-style-type: none"> Visual and tactile qualities Practical applications Other qualities (thermal insulation/stability, resistance to chemicals and fire, acoustic absorption, and workability) 	Timber as a renewable material <ul style="list-style-type: none"> Environmental benefits of timber Deforestation and replanting 	Characteristic v design material properties <ul style="list-style-type: none"> Characteristic values Partial factor for materials Design values of strength properties 	Glued laminated timber (glulam) <ul style="list-style-type: none"> Design data Complex sections
The tree <ul style="list-style-type: none"> Types of tree Cellular or organic structure Heartwood and sapwood Hardwoods and softwoods 	Sustainable sourcing <ul style="list-style-type: none"> Sustainable management of forests Temperate deciduous forests Temperate hardwoods Tropical hardwoods 	Structural detailing requirements <ul style="list-style-type: none"> Condition of timber members Moisture content Modifications Connections Protection of materials and components Handling Treatments 	Eurocode 5 and supplementary Standards <ul style="list-style-type: none"> Solid structural timber and related products: structural timber, glued laminated timber, laminated veneer lumber, wood-based panel products, plywood, particleboards, oriented strand board, fibre building boards, dowel-type fasteners
Moisture content and durability <ul style="list-style-type: none"> Moisture content Movement or shrinkage Durability 	Low carbon and timber buildings <ul style="list-style-type: none"> Carbon in association with buildings Sustainable timber production Thermal mass The contribution of timber to sustainable construction during manufacture and build Carbon sequestration 	Moisture and humidity <ul style="list-style-type: none"> Wood and moisture content Service classes Guidance on calculating with service classes (BS 5268-2 and Eurocode 5) 	Wood-based panels <ul style="list-style-type: none"> Harmonised standard for wood-based panel products Plywood Particleboards Oriented strand board Fibre building boards Service classes and examples of exposure conditions
Wood-based materials <ul style="list-style-type: none"> Non-structural materials Structural panels Advantages of engineered timber 	Introduction to decarbonisation <ul style="list-style-type: none"> Introduction to decarbonisation UK emission targets 	The Eurocode system <ul style="list-style-type: none"> Origin/purpose of Eurocodes List of published Eurocodes Principles and application rules National Annexes Non-contradictory complementary information Eurocode design basis 	Glued joints <ul style="list-style-type: none"> Design method Adhesives
Using the correct names when specifying timber <ul style="list-style-type: none"> Importance of the correct name How trees are named What is in a name 	Treatments and adhesives <ul style="list-style-type: none"> From tree to finished component Modern preservation techniques and natural durability Adhesives 	Bolted and dowelled connections <ul style="list-style-type: none"> Sizes and other limitations Axially loaded bolts Dowelled connections Comparison of load capacities 	Moment-resisting joints <ul style="list-style-type: none"> Assumptions Design method
Timber as a material: questions <ul style="list-style-type: none"> Two short-answer essay questions linking to this module 	Wood waste and reuse <ul style="list-style-type: none"> The significance of disposal routes Re-use Recycling Final disposal 	Nailed connections <ul style="list-style-type: none"> Sizes and other limitations Axially loaded nails and withdrawal resistance Head pull-through resistance 	Creep <ul style="list-style-type: none"> Quasi-permanent values of action (loads) Instantaneous deformations Final (including creep) deformations Creep deformation factor, k_{def}
Timber as a material: questions and answers <ul style="list-style-type: none"> Model answer detail for the two short-answer essay questions on the student question sheet 	Reusing timber <ul style="list-style-type: none"> Reusing waste timber Recycling timber into other components Carbon capture and release 	Design life, design situations and load duration classes <ul style="list-style-type: none"> Design life Design situations Types of load (actions) Duration of loads and load duration classes 	Structural columns and buckling <ul style="list-style-type: none"> Stability of columns Design for combined bending and axial compression Stability of beams with axial compression Column deflection due to axial and lateral loads
	Introduction to the Life Cycle Assessment of timber <ul style="list-style-type: none"> Life Cycle Assessment Carbon and timber Timber life cycle 	Limit state design <ul style="list-style-type: none"> Limit states Partial safety factors Expressions for design values of actions 	Vibration <ul style="list-style-type: none"> Mechanics of vibration Vibration sources Structural response to vibration Acceptable levels of floor vibration
	Wood for Good Lifecycle Database <ul style="list-style-type: none"> An introduction to the Wood for Good Lifecycle Database A summary of life cycle data for a range of wood and wood-based products An explanation for using the Wood for Good database The significance of the information in the Wood for Good Lifecycle Database 	Multiple fastener joints <ul style="list-style-type: none"> Factors affecting the strength of multiple fastener joints Unequal loading Splitting of the timber Design recommendations 	Structural timber – sizes and permitted deviations <ul style="list-style-type: none"> Target sizes for UK structural timber Machining and grade strength Permitted deviations Changes in size due to moisture content
FIND THIS ON THE TRADA WEBSITE	NEW! Environmental aspects of wood: questions <ul style="list-style-type: none"> Two short-answer essay questions linking to this module 	Screw connections <ul style="list-style-type: none"> Sizes and other limitations Axially loaded screws – withdrawal resistance 	Splitting and tension perpendicular to grain <ul style="list-style-type: none"> Calculation method
TRADA.co.uk	NEW! Environmental aspects of wood: questions and answers <ul style="list-style-type: none"> Model answer detail for the two short-answer essay questions on the student question sheet 		
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Timber connections	Structural characteristics of timber	Construction principles, specification and design	Fire resistance and timber buildings
Introduction to connections <ul style="list-style-type: none"> The evolution of timber structures Factors to be considered in connection design Fire resistance Connection durability 	Choosing species <ul style="list-style-type: none"> Classification and strength grading: softwoods, hardwoods, modified woods Strength properties/density 	Introduction to timber construction <ul style="list-style-type: none"> Timber construction Working within dimensional limits Wall thickness (cladding) Building orientation 	Concepts and considerations <ul style="list-style-type: none"> Reaction to fire and fire resistance Smoke, fire spread and fire growth Fire safety, fire fighting and escape routes Compartmentation and fire doors
Carpentry joints <ul style="list-style-type: none"> Connection criteria for carpentry joints Different carpentry joints 	Strength-reducing factors <ul style="list-style-type: none"> Growth features in timber Timber degradation 	Principles of design with timber <ul style="list-style-type: none"> Structural considerations Timber movement Differential movement Resistance to abrasion and impact 	Regulatory requirements <ul style="list-style-type: none"> History Current legislation Approved Document B Relevant European and British Standards
Dowel-type fasteners <ul style="list-style-type: none"> Different variations of dowel-type fasteners 	Strength properties <ul style="list-style-type: none"> Timber structure Strength classes and grading Resistance to applied stresses 	Designing for durability – Part 1: Preservative <ul style="list-style-type: none"> Preservative treatments Natural durability Heat treatment Chemical treatment Coatings 	Timber materials and products <ul style="list-style-type: none"> Timber Engineered wood products Panel products and sheathing materials Coating and flame retardant treatments Certification and testing
Metal connectors <ul style="list-style-type: none"> Metal plate fasteners Connectors with bolts 	Joints and connections <ul style="list-style-type: none"> Timber splitting Stresses induced by moisture changes Potential temperature effects in the event of fire Corrosion of fasteners Decay of timber 	Designing for durability – Part 2: Principles of design <ul style="list-style-type: none"> Drainage and ventilation Protection Allowing for moisture content Protective coatings Shelter/shielding Chemicals Weathering 	Building design – structural beams and columns <ul style="list-style-type: none"> Sacrificial timber method – columns and beams Insulation method Connections in fire Material properties Weathering
Special connectors <ul style="list-style-type: none"> Examples of special connectors 	Drying and moisture content <ul style="list-style-type: none"> Timber drying Strength and moisture content Service classes Moisture content and connections 	Designing for building performance <ul style="list-style-type: none"> Thermal performance Acoustic performance 	Construction – wall and floor systems <ul style="list-style-type: none"> Material selection and specification Standard details Floors Walls Supporting structures
Connections with adhesives <ul style="list-style-type: none"> Resin-anchored bolts Splice plates and gusset plates Dowelled end joints Site glueing Types of adhesive Design criteria Safety precautions 	Fire performance <ul style="list-style-type: none"> Reaction to fire Fire resistance 	Introduction to off-site construction and construction sequence <ul style="list-style-type: none"> Introduction to off-site construction Types of modern off-site construction Limitations to off-site construction Designing for off-site construction Construction sequence for a two-storey detached house 	Management <ul style="list-style-type: none"> Assessment of risk Construction stage Installation and maintenance End-user contributions and user awareness
Connections for various assembly forms – Part 1 <ul style="list-style-type: none"> Connections for beams Connections for round timber structures Connections for unbraced frames Connections for braced frames Connections for arches and portal frames 	Engineered timber products <ul style="list-style-type: none"> Limiting factors of natural timber Engineered timber – the products: layered composites – glulam, cross-laminated timber, laminated veneer lumber, plywood; particle composites – parallel strand lumber, particleboards, oriented strand board; structural timber composites and structural assemblies Engineered products – the advantages 	Introduction to timber cladding <ul style="list-style-type: none"> Purpose and uses of cladding Types of cladding: horizontal, vertical and diagonal boards, cladding on curved surfaces, charred wood Design considerations: ventilation and drainage, board sizes, fire protection Timber selection and fixings: choice of species, modified timber, environmental and certification aspects, fixings Protection and finishes: preservatives, surface protection 	
Connections for various assembly forms – Part 2 <ul style="list-style-type: none"> Connections for trusses Connections for platform frames Connections for panel systems Connections for curved and double-curved lattices 		Timber cladding – detail design <ul style="list-style-type: none"> Timber selection: natural durability, movement, choice of species, quality of timber Control of moisture: allowing for moisture movement Fixings: softwood, hardwood 	

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