Madera: Recuperación, Reutilización y Reciclaje

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Grupo de Investigación “Construcción con Madera”, UPM

II FORO DE BIOECONOMÍA DE CASTILLA Y LEÓN

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2023

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RIS3 CASTILLA Y LEÓN 2021-2027

NOS IMPULSA

competitividad empresarial ice

Junta de Castilla y León

Coordina

cesefor
CORAZÓN FORESTAL, espíritu investigador

Apoya

Caja rural de Soria
contigo donde estés

Colabora

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aveBiom

CENTRO TECNOLÓGICO CARTIF

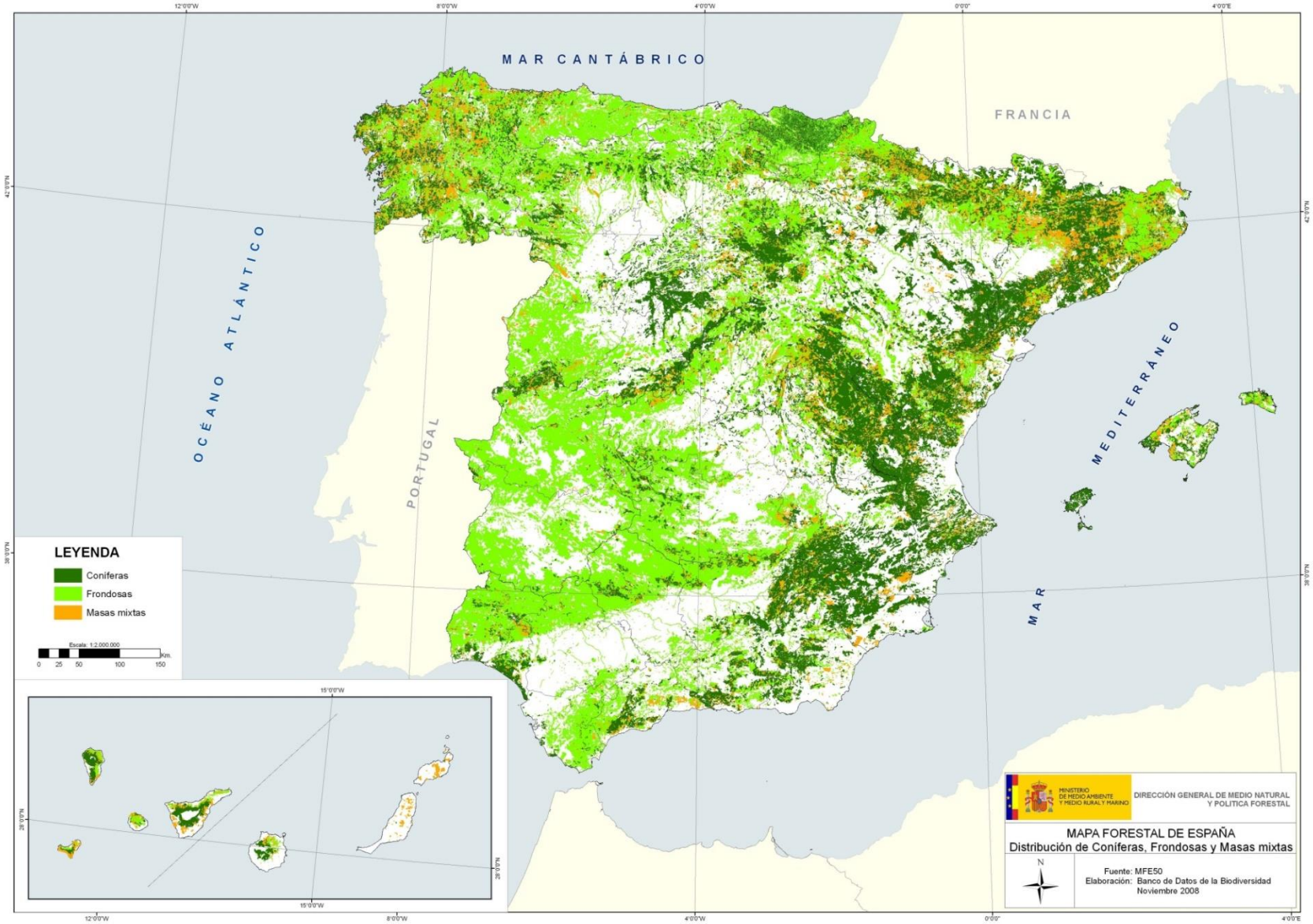
EREN
ENTE REGIONAL DE LA ENERGÍA DE CASTILLA Y LEÓN

Junta de Castilla y León

INSTITUTO TECNOLÓGICO AGRARIO
Junta de Castilla y León
Consejería de Agricultura y Ganadería

VITARTIS


6 CO_2 +
6 H_2O
6 O_2
$C_6H_{12}O_6$


MAR CANTÁBRICO
FRANCIA
OCÉANO ATLÁNTICO
PORTUGAL
MAR MEDITERRANEO
MAR
LEYENDA
Coníferas
Frondosas
Masas mixtas
Escala: 1:2.000.000
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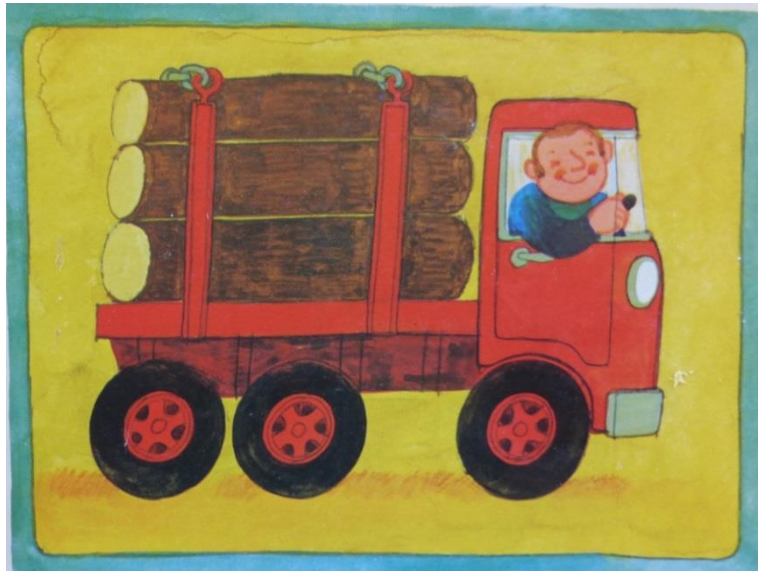
MINISTERIO DE MEDIO AMBIENTE Y MEDIO RURAL Y MARINO
DIRECCIÓN GENERAL DE MEDIO NATURAL Y POLITICA FORESTAL
MAPA FORESTAL DE ESPAÑA
Distribución de Coníferas, Frondosas y Masas mixtas
N
Fuente: MFE50
Elaboración: Banco de Datos de la Biodiversidad
Noviembre 2008



Ali Mitgutsch. 1986. *Del árbol a la mesa.* Fern Canyon Pr. ISBN-10: 9684163037


NI UNA MENOS
XUPAMBIZI
XUPA
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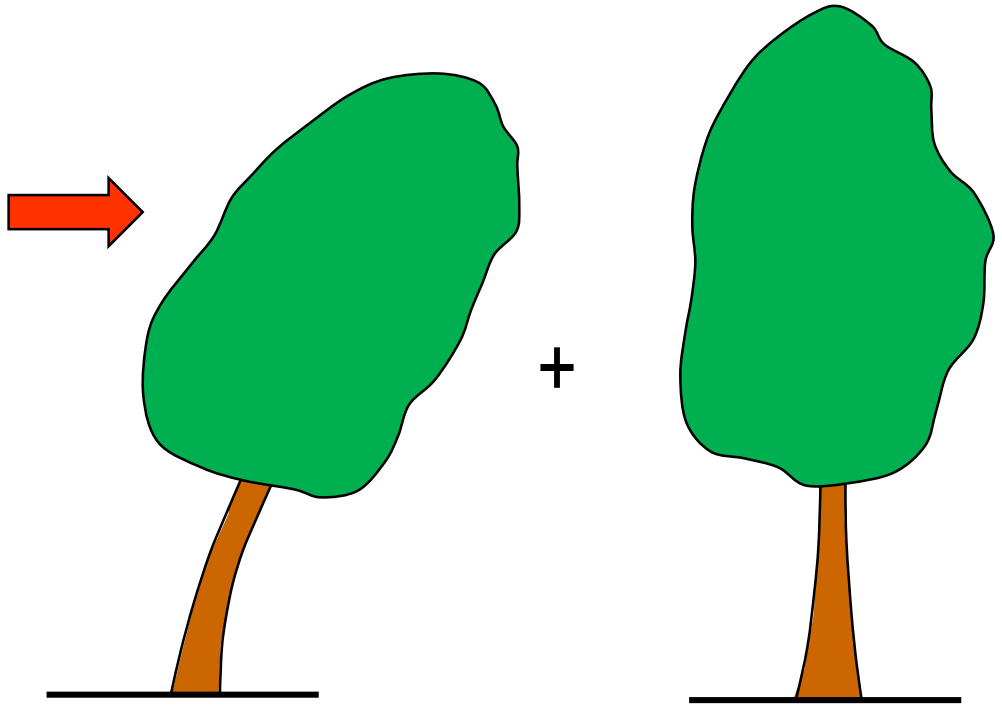
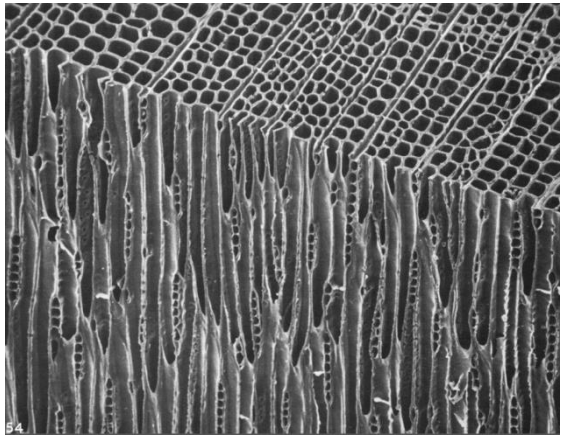
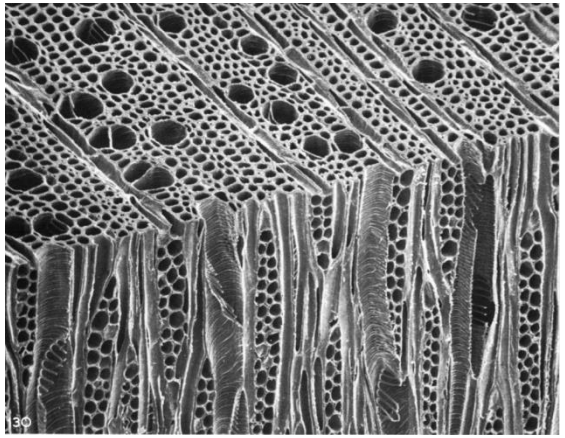




Butterfield, B.G. et al. 1980. Three-dimensional structure of wood: an ultrastructural approach.



Article

Evidence for the earliest structural use of wood at least 476,000 years ago

https://doi.org/10.1038/s41586-023-06557-9

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L. Barham[1]✉, G. A. T. Duller[2], I. Candy[3], C. Scott[4], C. R. Cartwright[5], J. R. Peterson[4], C. Kabukcu[4,6], M. S. Chapot[2], F. Melia[4], V. Rots[7], N. George[4], N. Taipale[7], P. Gethin[4] & P. Nkombwe[8]

Wood artefacts rarely survive from the Early Stone Age since they require exceptional conditions for preservation; consequently, we have limited information about when and how hominins used this basic raw material[1]. We report here on the earliest evidence for structural use of wood in the archaeological record. Waterlogged deposits at the archaeological site of Kalambo Falls, Zambia, dated by luminescence to at least 476 ± 23 kyr ago (ka), preserved two interlocking logs joined transversely by an intentionally cut notch. This construction has no known parallels in the African or Eurasian Palaeolithic. The earliest known wood artefact is a fragment of polished plank from the Acheulean site of Gesher Benot Ya'aqov, Israel, more than 780 ka (refs. 2,3). Wooden tools for foraging and hunting appear 400 ka in Europe[4–8], China[9] and possibly Africa[10]. At Kalambo we also recovered four wood tools from 390 ka to 324 ka, including a wedge, digging stick, cut log and notched branch. The finds show an unexpected early diversity of forms and the capacity to shape tree trunks into large combined structures. These new data not only extend the age range of woodworking in Africa but expand our understanding of the technical cognition of early hominins[11], forcing re-examination of the use of trees in the history of technology[12,13].

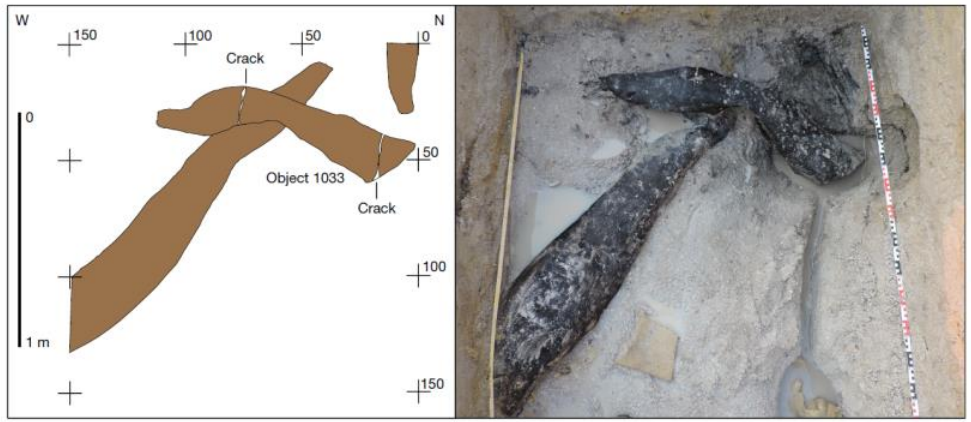
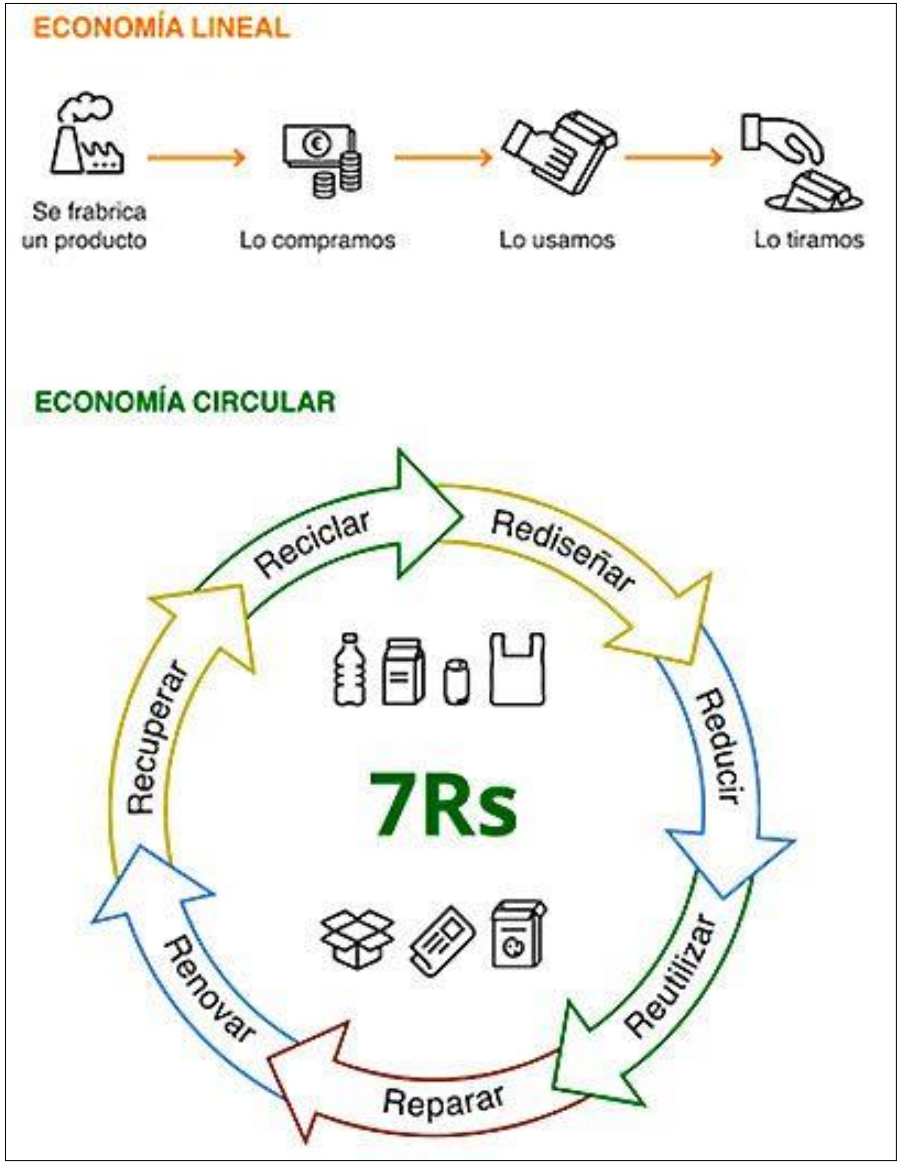


Fig. 3 | Structural unit formed by two overlapping logs in BLB5. The underlying log passes through a central notch cut into the upper log (object 1033) and extends into the section. Plan view of the unit (left) and during excavation (right). The numbers refer to the distance in centimetres.

Barham, L., Duller, G.A.T., Candy, I. et al. 2023. Evidence for the earliest structural use of wood at least 476,000 years ago. Nature. https://doi.org/10.1038/s41586-023-06557-9

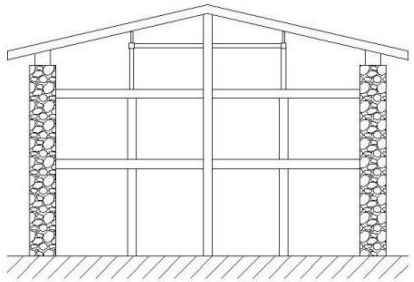

EXPLORER
Bill Nye's Global Meltdown
Sunday, November 1 on the National Geographic Channel
NOVEMBER 2015
NATIONAL GEOGRAPHIC
Cool it.
The Climate Issue


ECONOMÍA LINEAL
Se frabrica un producto
Lo compramos
Lo usamos
Lo tiramos
ECONOMÍA CIRCULAR
Reciclar
Rediseñar
Reducir
Reutilizar
Reparar
Renovar
Recuperar
7Rs


Los 6 Colores del Reciclaje
Plásticos y Latas
Papeles y Cartones
Vidrio
Materiales Peligrosos
Residuos Orgánicos
Varios

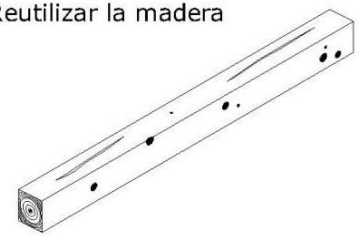

PAPEL CARTÓN
VIDRIO

1ª vida
Edificio de madera



Estructura de postes y vigas

2ª vida
Reutilizar la madera

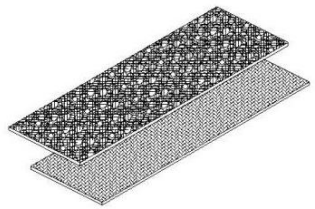


Madera de gran escuadría
recuperada de derribo

3ª vida
Reciclar en productos

Productos laminados
encolados (ERWP)

4ª vida
Reciclar en tableros



Tableros de partículas
(de astillas)

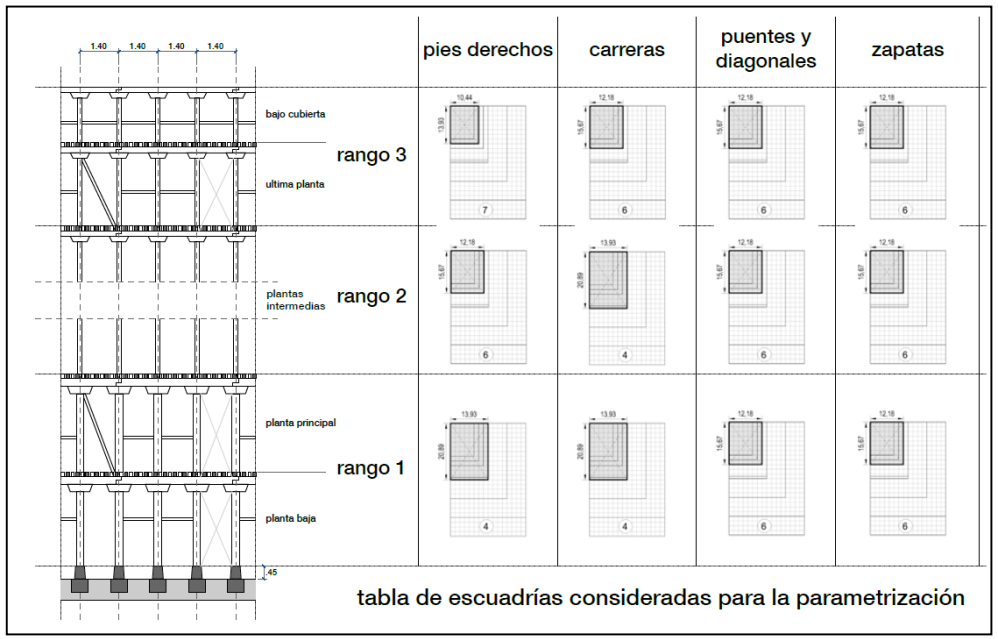
5ª vida
Producción de energía

Quemar astillas

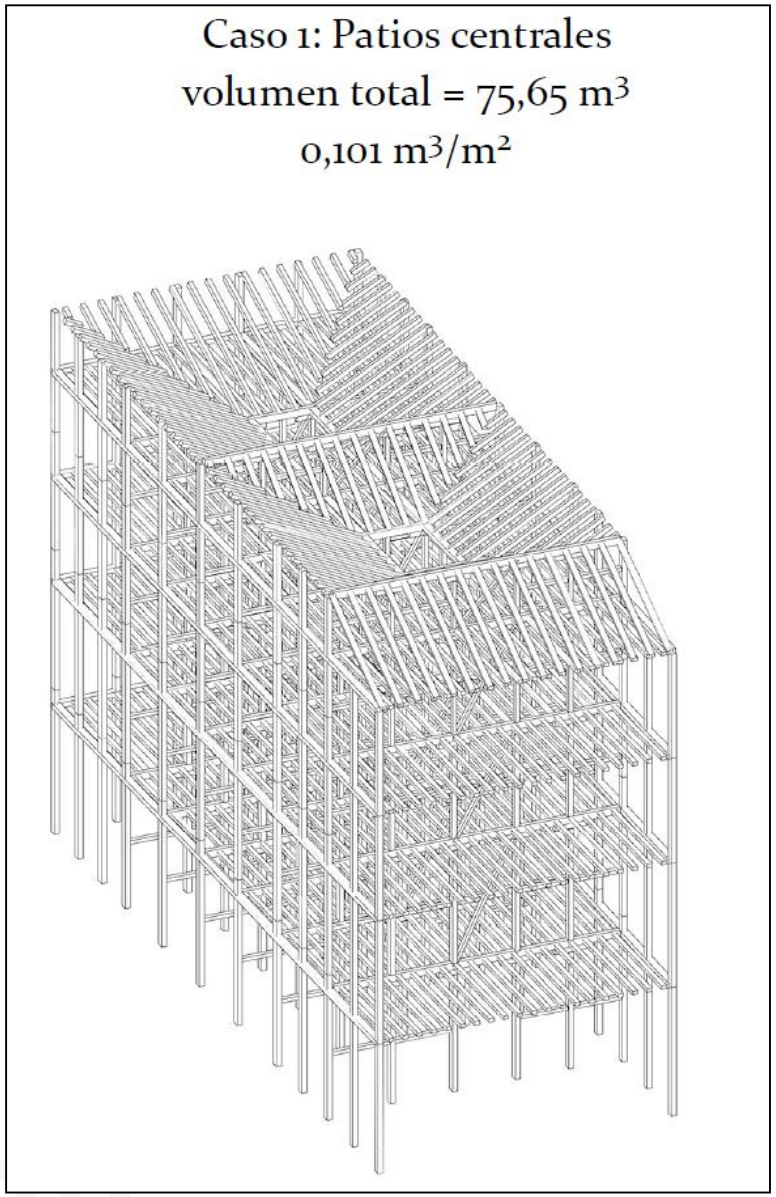
Recuperación

Análisis cuantitativo y cualitativo de los bancos de materiales

fuente vs. sumidero



Batista Martín, P. 2020. Madera recuperable estructural de edificaciones del s. XIX. Trabajo Fin de Grado. ETSAM, UPM



Recuperación

Análisis de las técnicas de demolición y estimación de los rendimientos de recuperación

Demolición

Deconstrucción / desmontaje

Nasiri, B.; Walsh, St.J.; Arana-Fernández, M.; Batista-Martín, P.; Llana, D.F.; Íñiguez-González, G.; Shotton, E.; Hughes, M. 2021. Inventory of wood materials currently used in construction. AALTO report

Recuperación

Diseño para el Desmontaje y la Reutilización (DfDR)

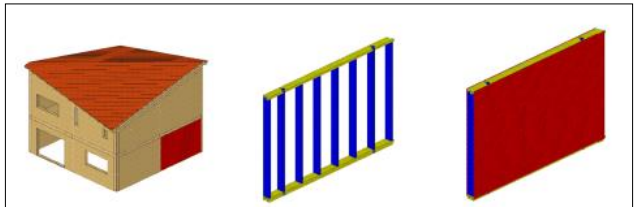


Figure 3.2.4.4: Wall panel elements identified by colour

Figure 3.2.4.5: Wall panel frame and planks

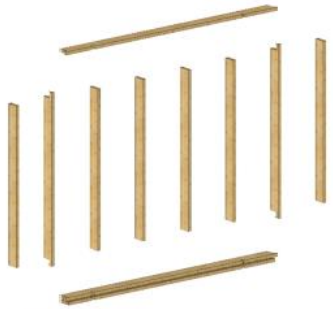


Figure 3.2.4.6: elements in wall panel frame

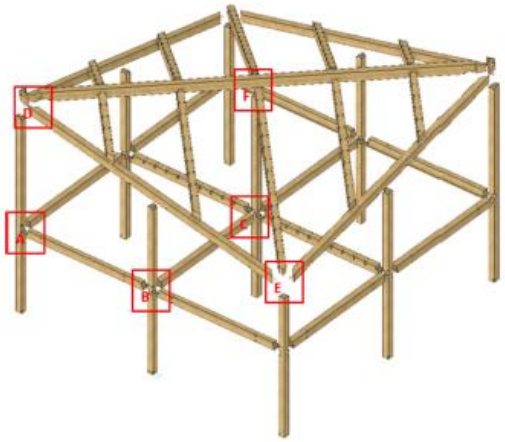


Figure 3.2.3.4: Details on primary load-bearing structure

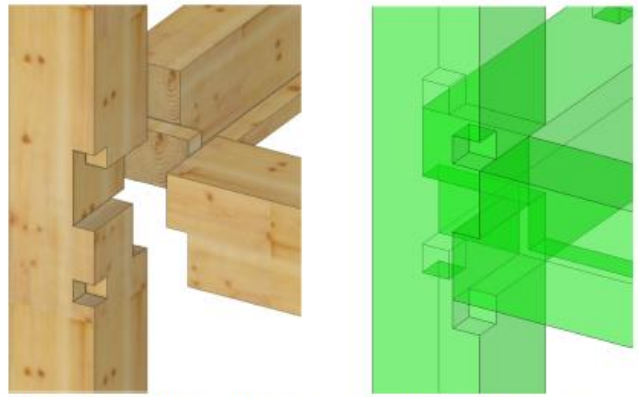
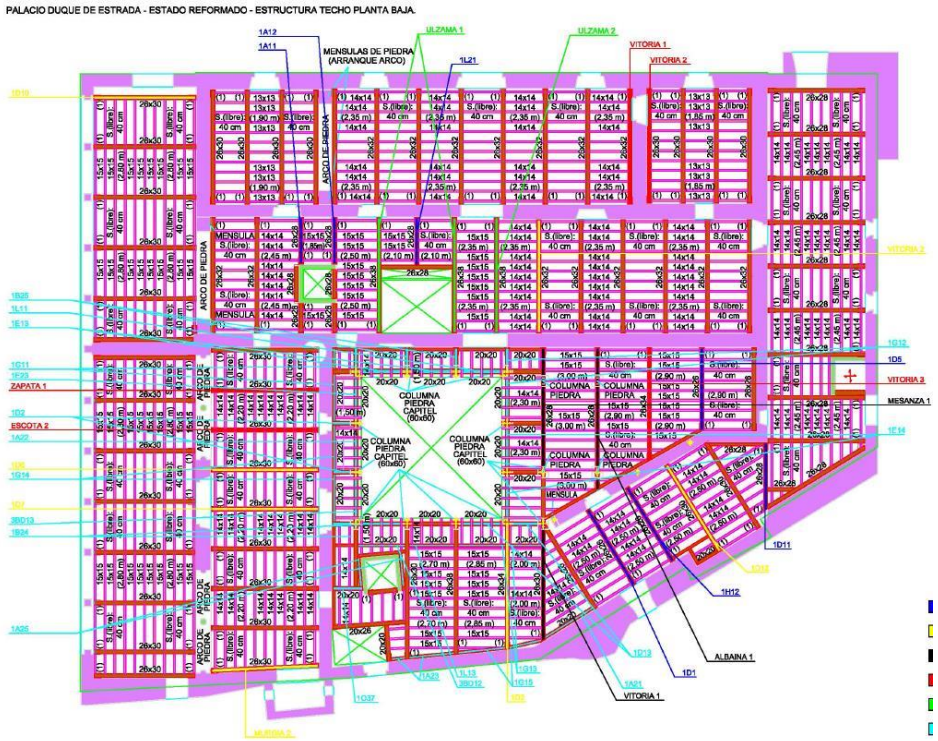


Figure 3.2.3.5: Detail A: Wood Connection between posts and beam. Corner

González-Alegre, V.; García Barbero, M.; Llana, D.F.; Íñiguez-González, G. 2021. Design for Deconstruction and Reuse (DfDR): Cuenca Village, Spain - Case Study. UPM report.

Reutilización

Rehabilitación: madera aserrada estructural recuperada



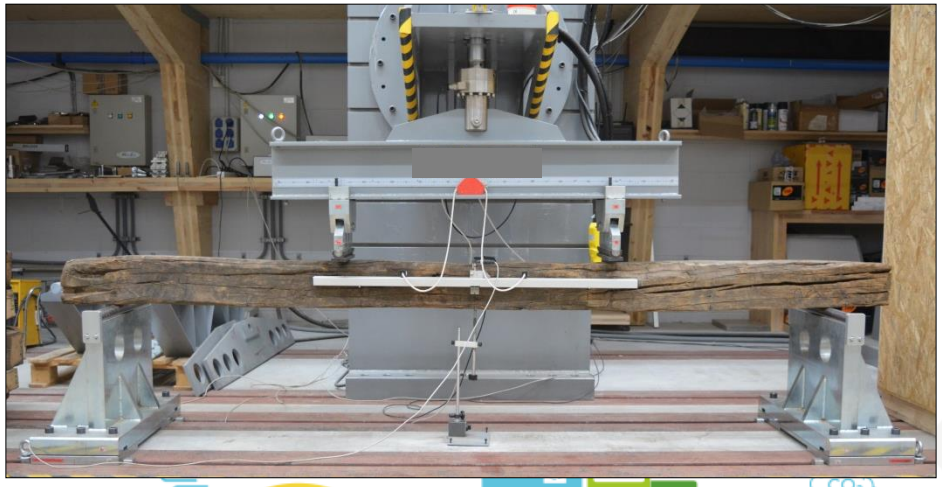
Desarrollo de documentos técnicos y normativos de aplicación

Reutilización

Clasificación y caracterización de la madera recuperada

www.infuturewood.info

www.recowers.wordpress.com



Íñiguez-González, G.; Arriaga, F.; Osuna-Sequera, C.; Esteban, M.; Ridley-Ellis, D. 2019. Nondestructive Measurements in Reclaimed Timber from Existing Structures. 21st International Nondestructive Testing and Evaluation of Wood Symposium

Reciclaje

Fabricación de productos laminados (Engineered Recovered Wood Products (ERWPs))

Llana, D. F.; González-Alegre, V.; Portela, M.; Íñiguez-González, G. 2022. Cross Laminated Timber (CLT) manufactured with European oak recovered from demolition: Structural properties and non-destructive evaluation. Construction and Building Materials; 339. https://doi.org/10.1016/j.conbuildmat.2022.127635

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