



Heritage Problems. Causes. Solutions



Erasmus+

Heritage Problems. Causes. Solutions

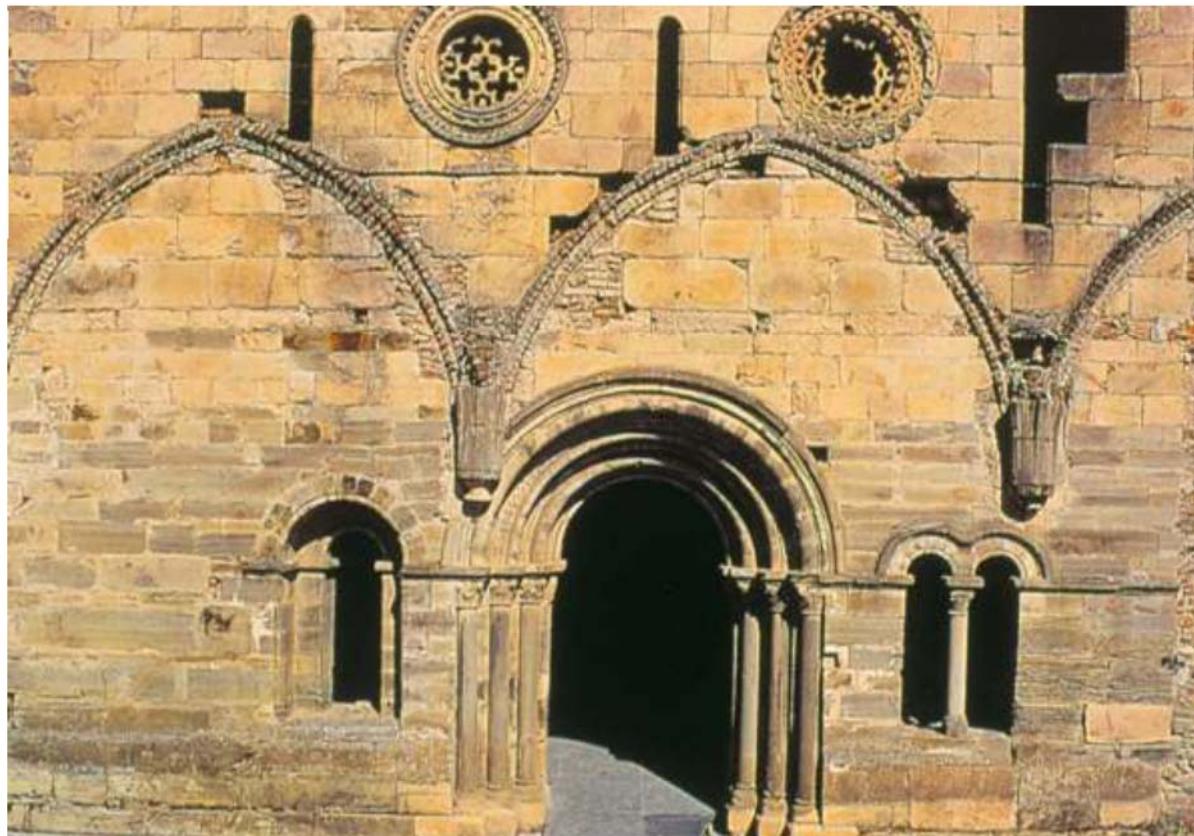
SH

Sustainable Heritage

EC

Elective Courses

3 ECTS



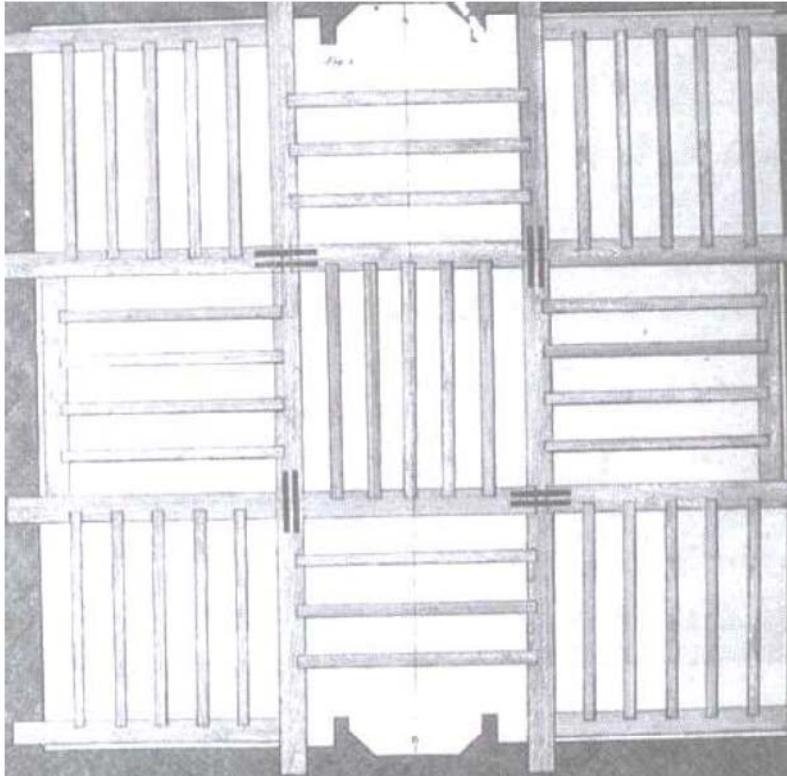
1. INTRODUCTION
2. FOUNDATIONS: DAMAGES
3. FOUNDATIONS: REPAIR SOLUTIONS
4. WALLS: CONSTRUCTIVE SYSTEM
5. WALLS II: PROBLEMS AND CAUSES
6. WALLS III: SOLUTIONS
7. VAULTS: CONSTRUCTIVE SYSTEM
8. VAULTS II: PROBLEMS AND CAUSES
9. VAULTS III: SOLUTIONS
10. FLOORS
- 11. WOOD**
12. ROOFS: CONSTRUCTIVE SYSTEM, PROBLEMS
AND CAUSES
13. ROOFS II: SOLUTIONS
14. OTHER TRADITIONAL STRUCTURES
15. SURFACE FINISHES, INTERIOR WOODWORK

CURRICULAR CONTENTS

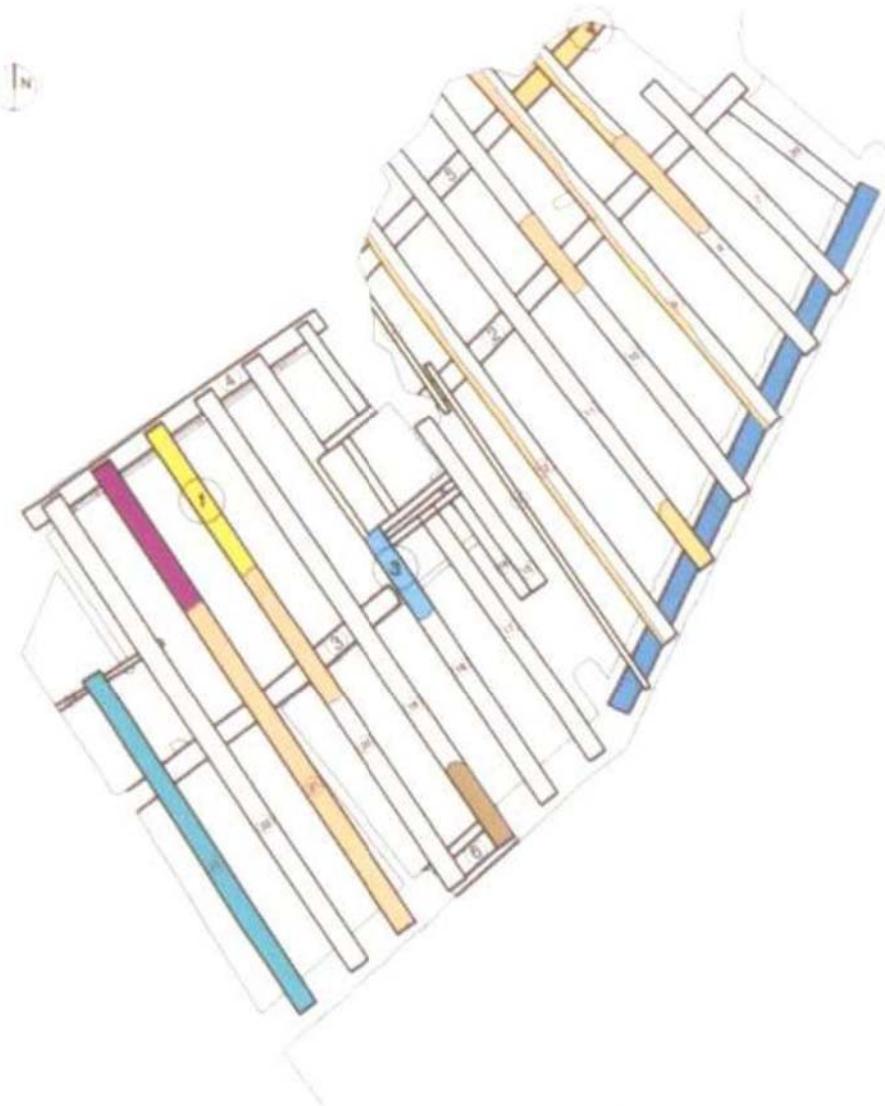
HERITAGE PROBLEMS. CAUSES. SOLUTIONS

Heritage Problems. Causes. Solutions

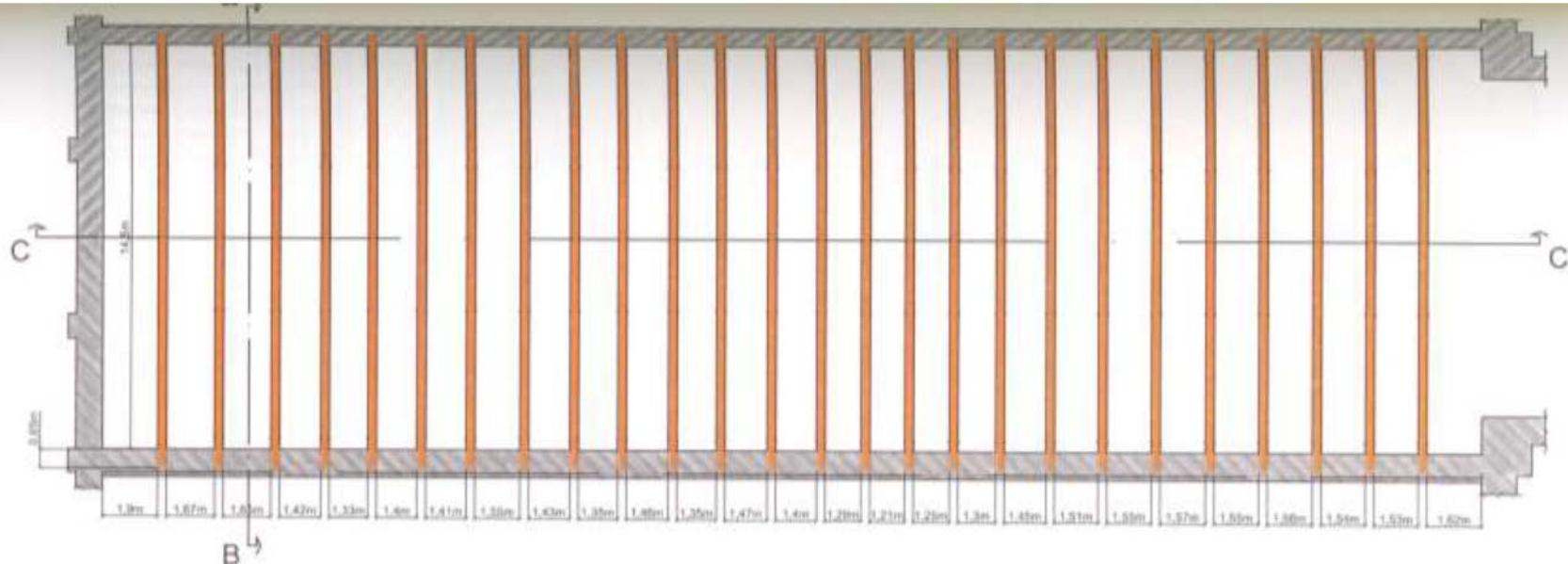
3 ECTS



11 WOOD



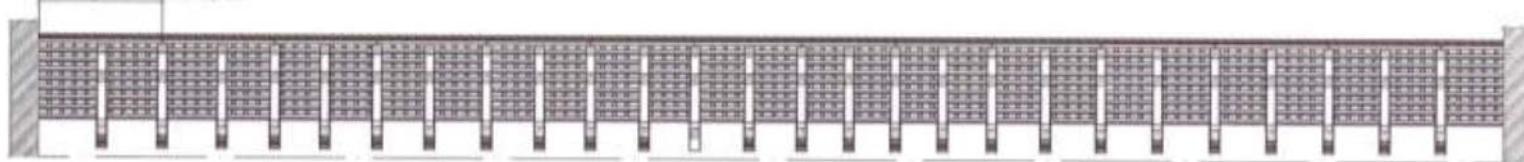
- | | | |
|---|-------------------------------|-------------------------------|
| Insectos vórticos (cucarachas) | Madera cuarterada | Madera cuarterada y pudrición |
| Insectos vórticos (ardillas) | Pudrición | Madera cuarterada y xilófagos |
| Insectos vórticos (hermitas) | Marchas de humedad | Hongos |
| Madreja acorchaada y manchas de humedad | Insectos vórticos y pudrición | Nido de aves |
| Madera acorchaada | Madera acorchaada y pudrición | Rosuras |



Sezione C-C navata centrale

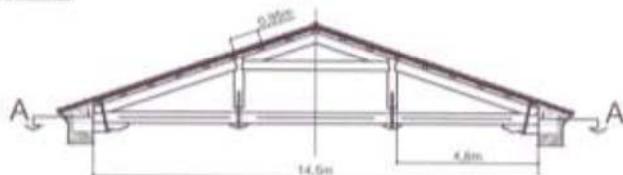
scala 1:150

Lunghezza arcancello Spz = 2 x interasse capriate



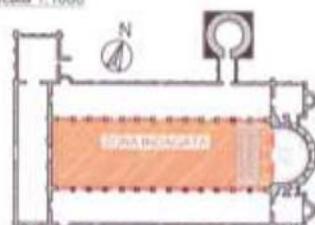
Sezione B-B navata centrale

scala 1:150



Schema pianta Basilica

scala 1:1000



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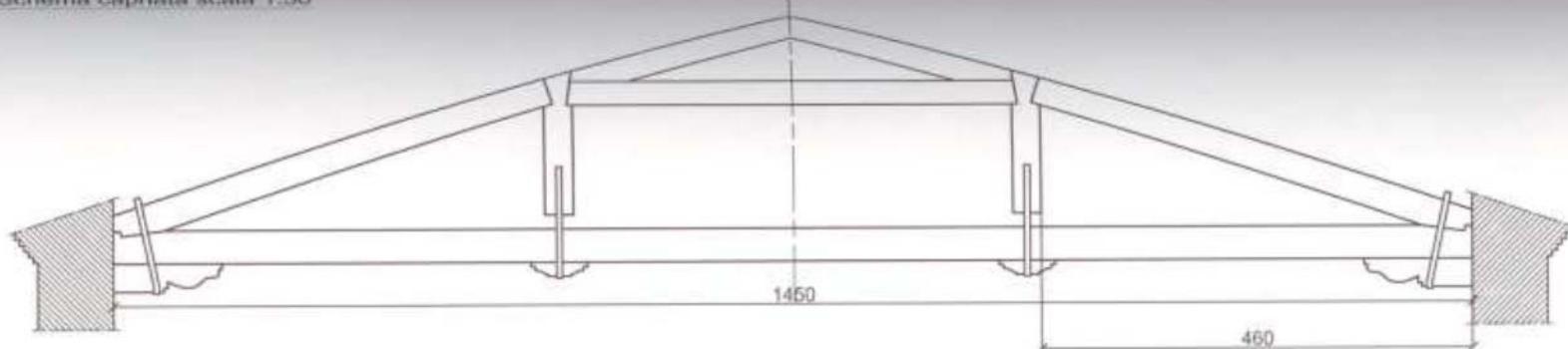
n° Comm.

3151/05

ALLEGATO:

rilievo della copertura - sezioni navata centrale

Schema capriata scala 1:50



Codifica indicazione delle essenze legnose



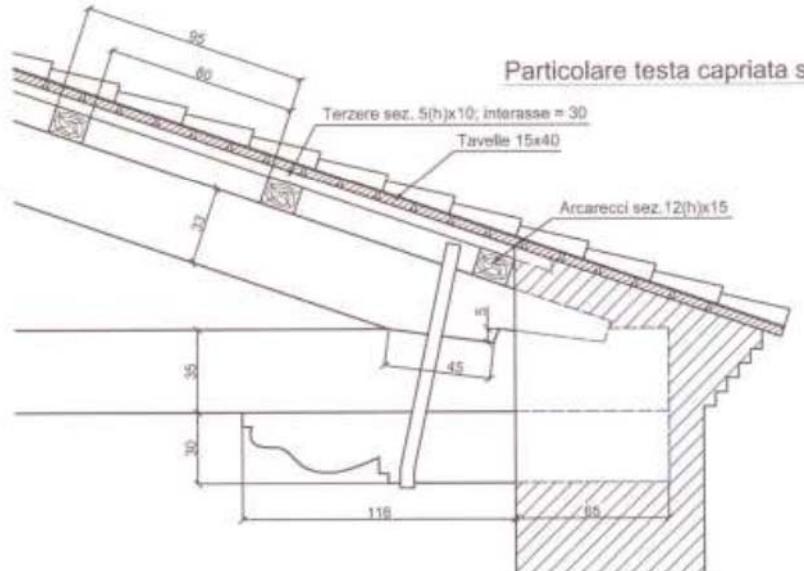
parti in legno di Larice (*Larix decidua*)



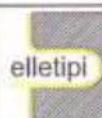
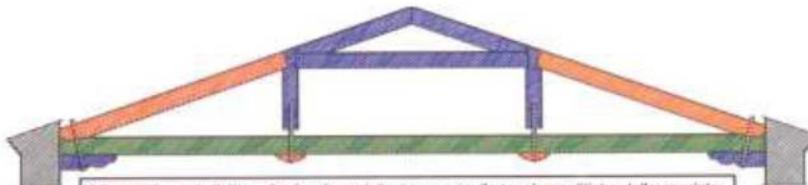
parti in legno di Pino (*Pinus sylvestris*)



parti in legno di Pioppo (*Populus sp.*)



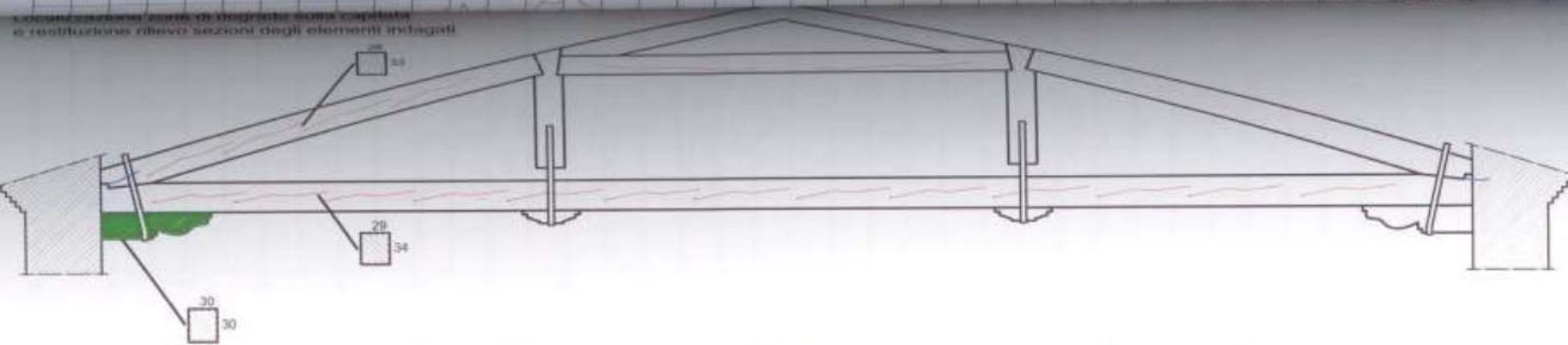
----- parti rilevate indirettamente



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ALLEGATO:
rilievo della copertura: schema della capriata



A: attacco biotico di entità grave

B: attacco biotico di entità media

C: attacco biotico di entità contenuta

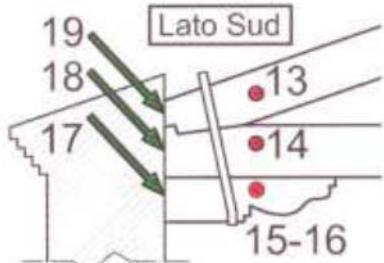
D: rottura del dente di taglio sulla catena con scorrimento relativo degli elementi:

E: lesione in corrispondenza del dente di taglio localizzata su catena e/o puntone:

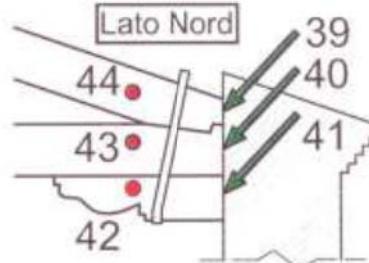
F: presenza di fessurazioni da ritiro

(verificare posizione, profondità ed ampiezza nella tabella descrittiva)

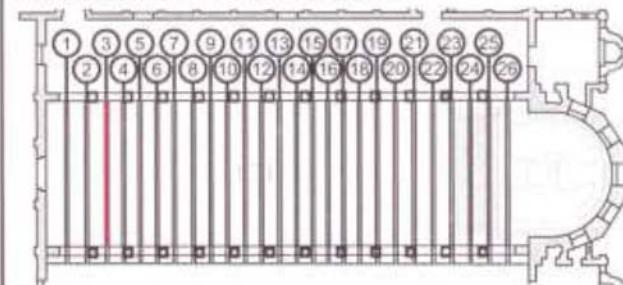
localizzazione e codifica prove resistografiche sulla capriata



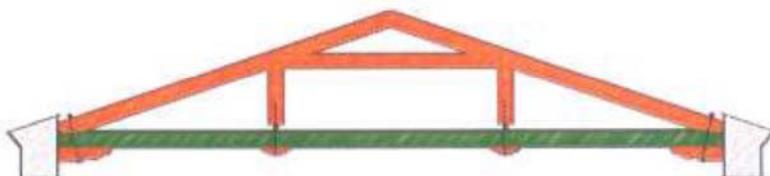
perforazione a 45°
● perforazione a 90°



localizzazione della capriata indagata



riconoscimento tipologico delle essenze legnose



- parti in legno di Larice (*Larix decidua*)
- parti in legno di Pino (*Pinus sylvestris*)

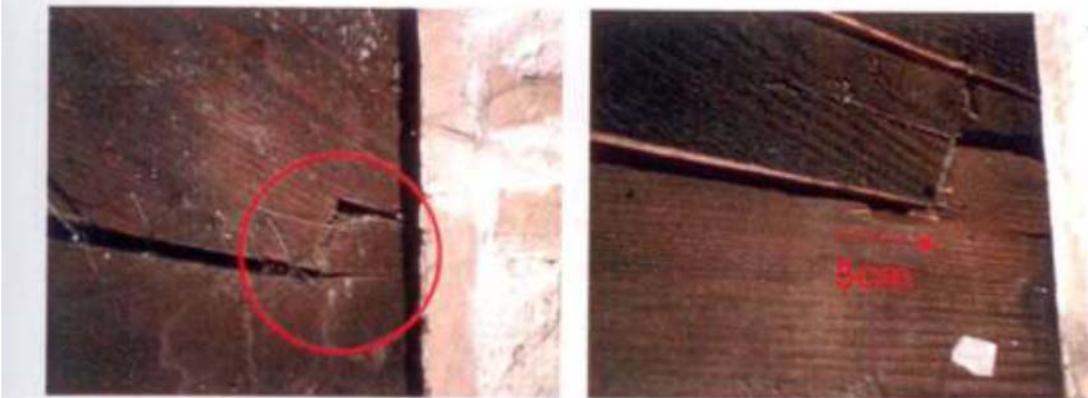
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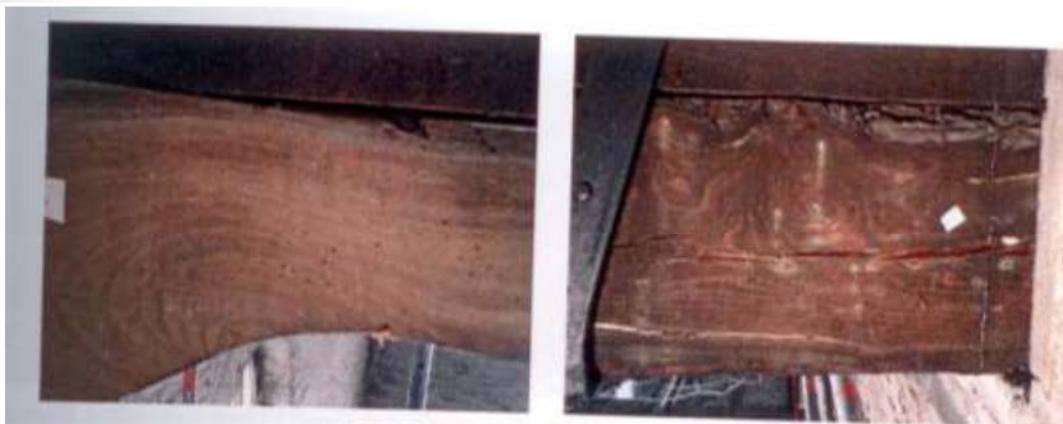
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scheda diagnostica analitica capriata n.3



damage of the mortising and breaking of the same with relative sliding of the elements



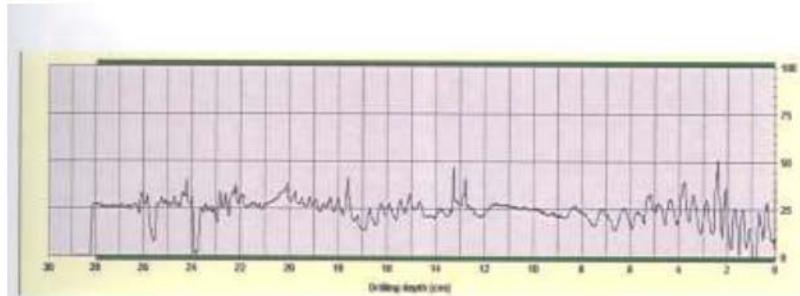
attack of anobid and cerambycid xylophages



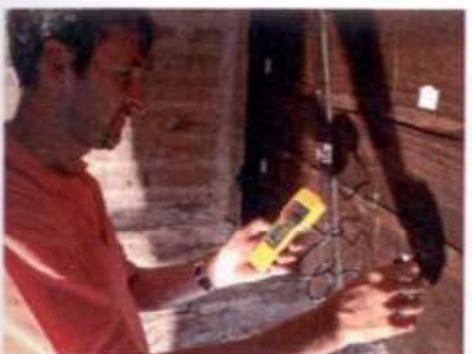
vertical deviation between bracket and chain and longitudinal cracks due to withdrawal on the chain



visual, photographic and geometric survey



depth-resistance diagram of a healthy bracket



moisture survey and example of the coding assigned to the truss with indication of the execution points of the perforations



depth-resistance diagram of a deteriorated bracket



perforations with resistograph, in the section and in correspondence of the support

CONSOLIDATION OF WOODEN STRUCTURES

- BETA SYSTEM
- EXTERNAL REINFORCEMENTS

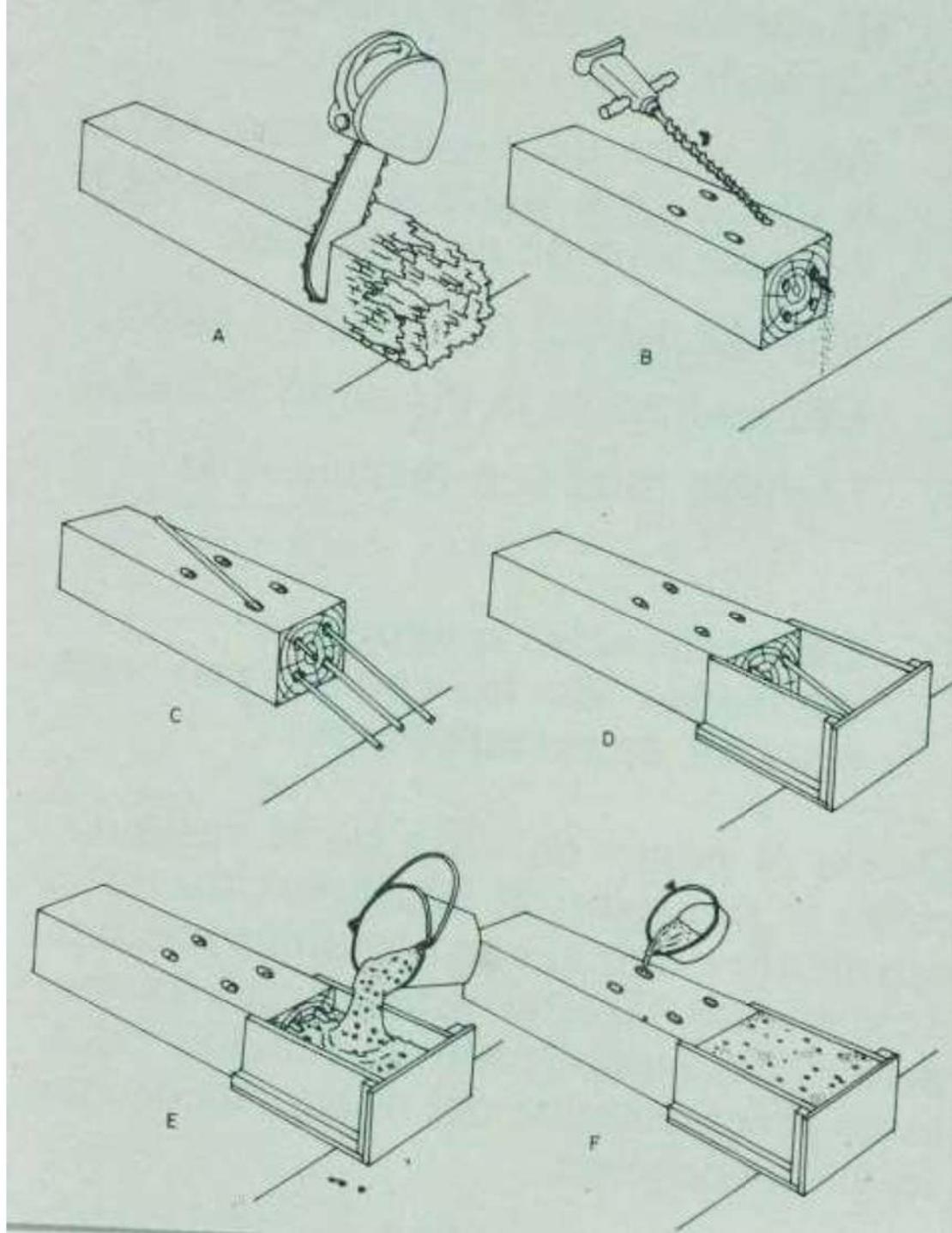


A technique for consolidating structural wood elements that permits the recuperation not only of their mechanical capacity but also their original appearance. This technique doesn't require disassembling elements because the treatment is done on-site,

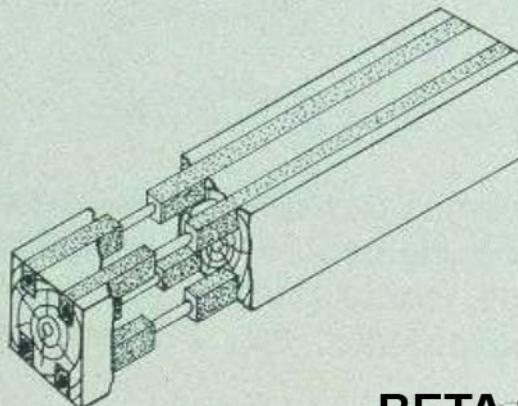
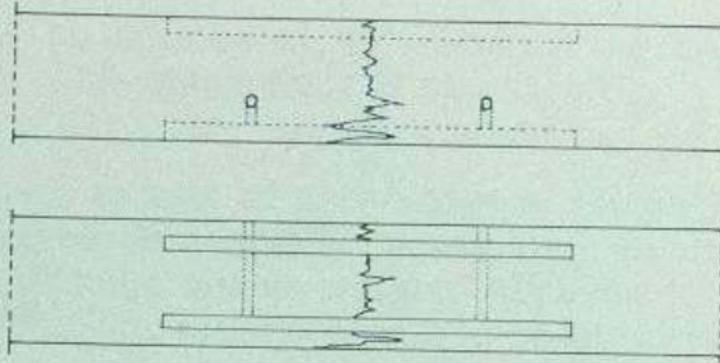
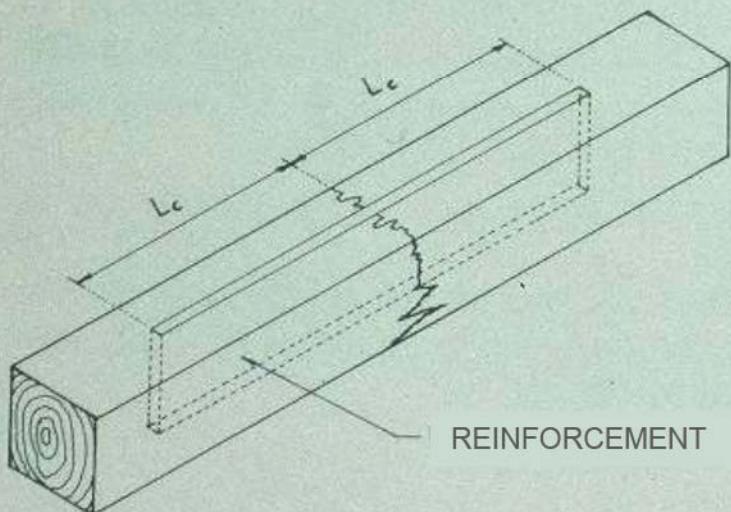
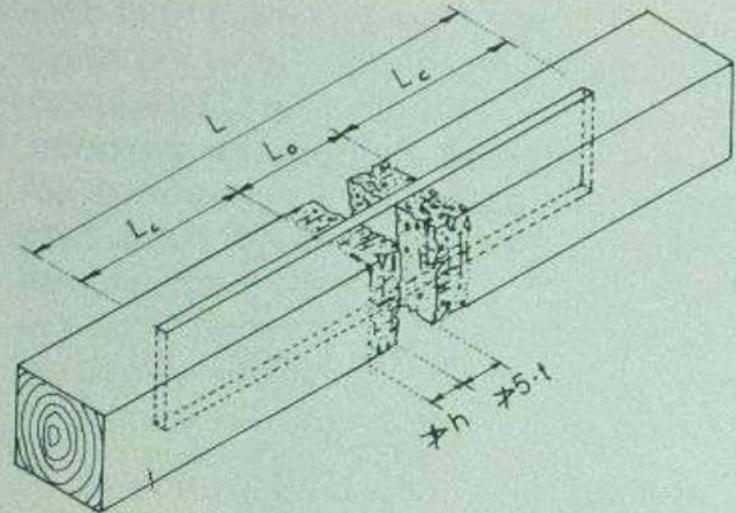
11 WOOD SOLUTIONS **BETA SYSTEM**

Steps of the Beta System:

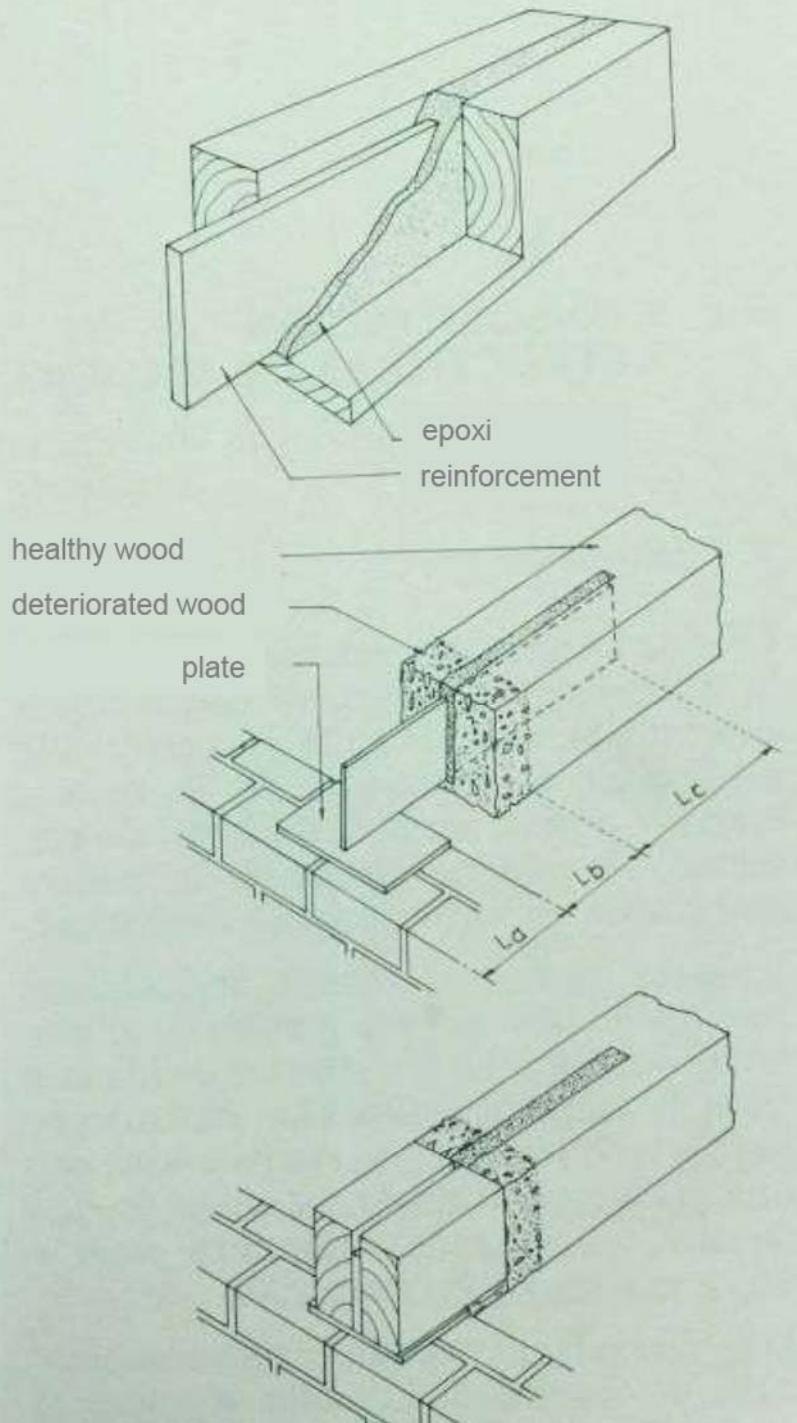
1. Elimination of damaged wood from the support of a scissor truss.
2. Perforation and placement of the pretensioned rods.
3. Forming and filling with epoxy resin grout.
4. Final appearance of the repaired zone.



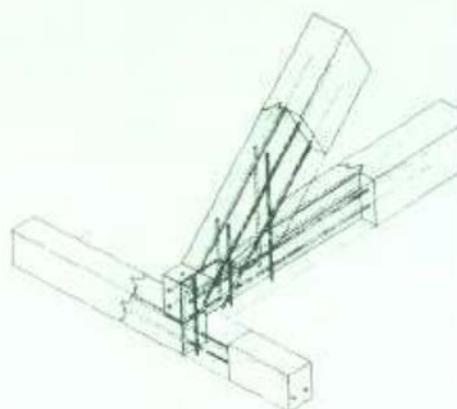
BETA SYSTEM
WOOD STRUCTURES



BETA SYSTEM
WOOD STRUCTURES



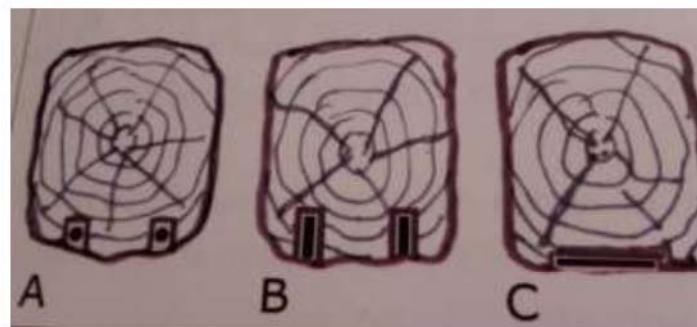
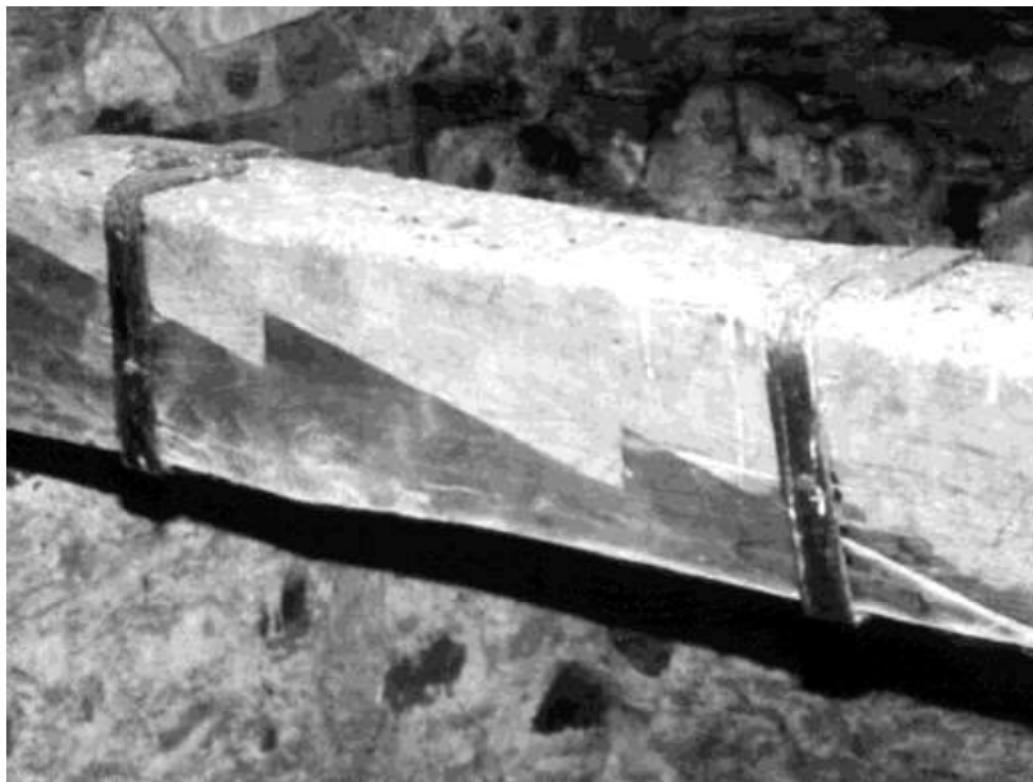
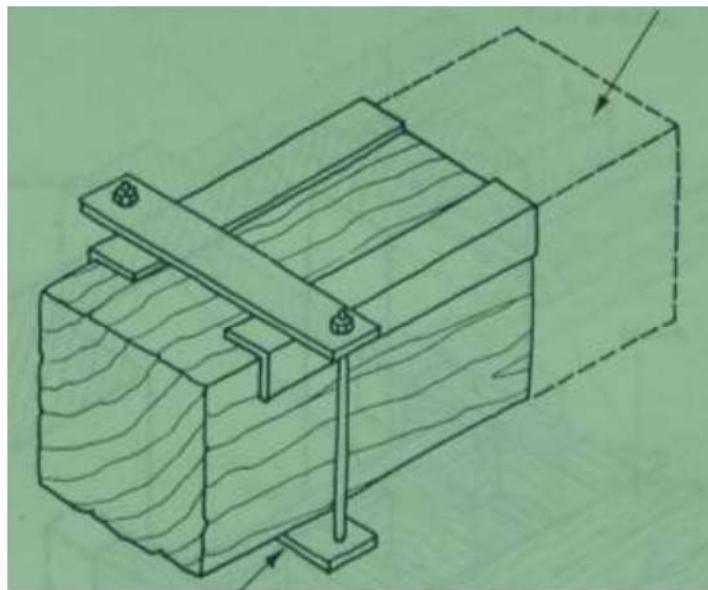
BETA SYSTEM WOOD STRUCTURES



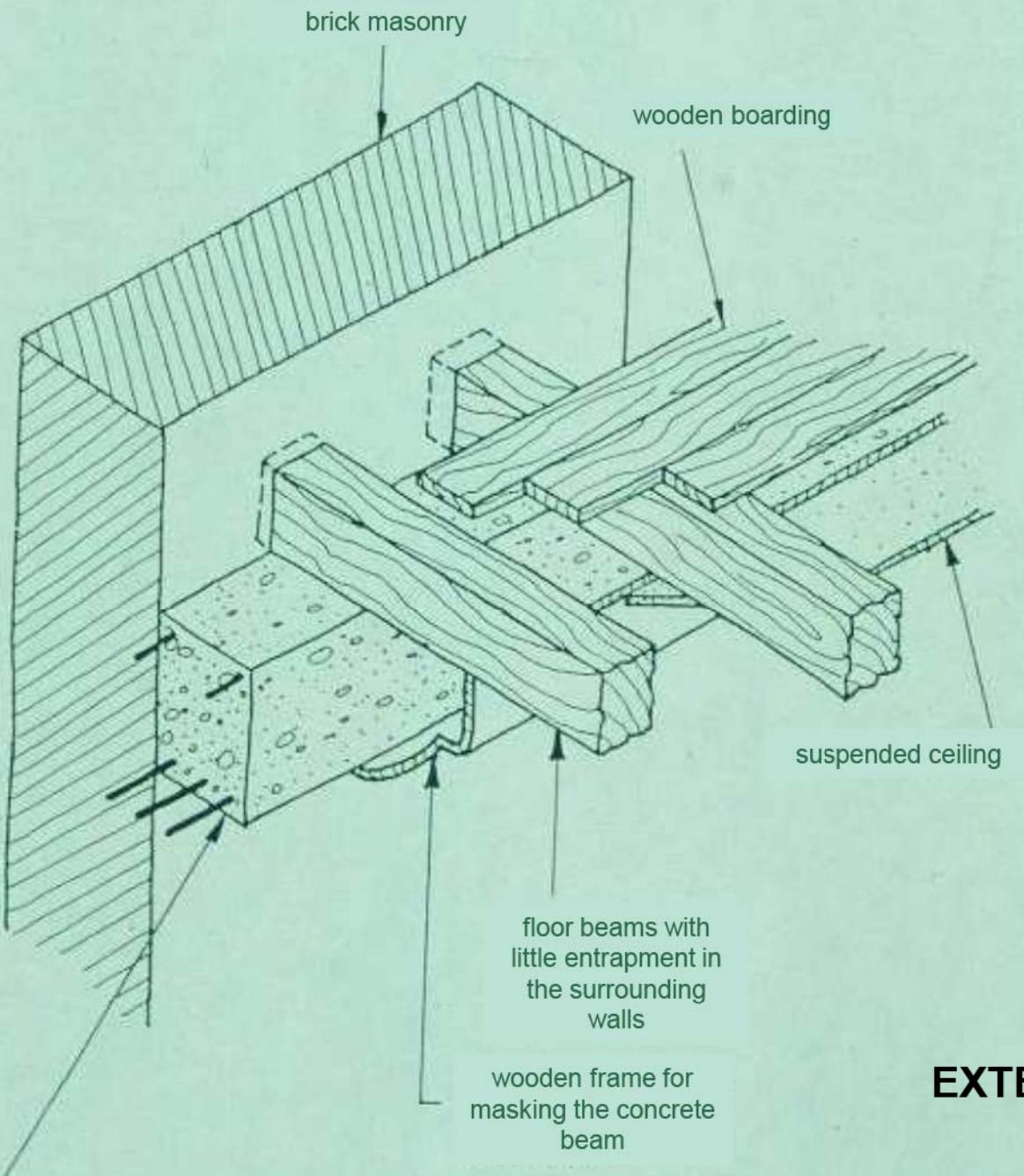
BETA SYSTEM WOOD STRUCTURES



11 WOOD
SOLUTIONS
EXTERNAL REINFORCEMENTS

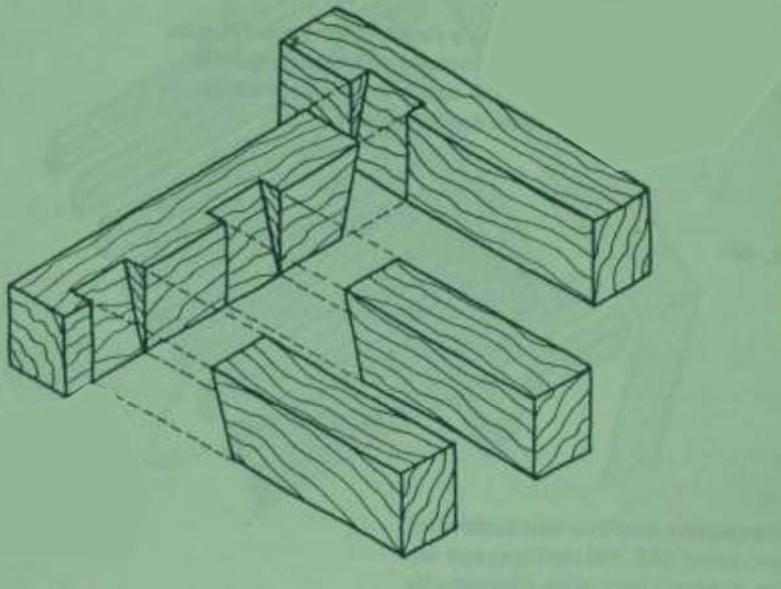


EXTERNAL REINFORCEMENTS WOODEN STRUCTURES

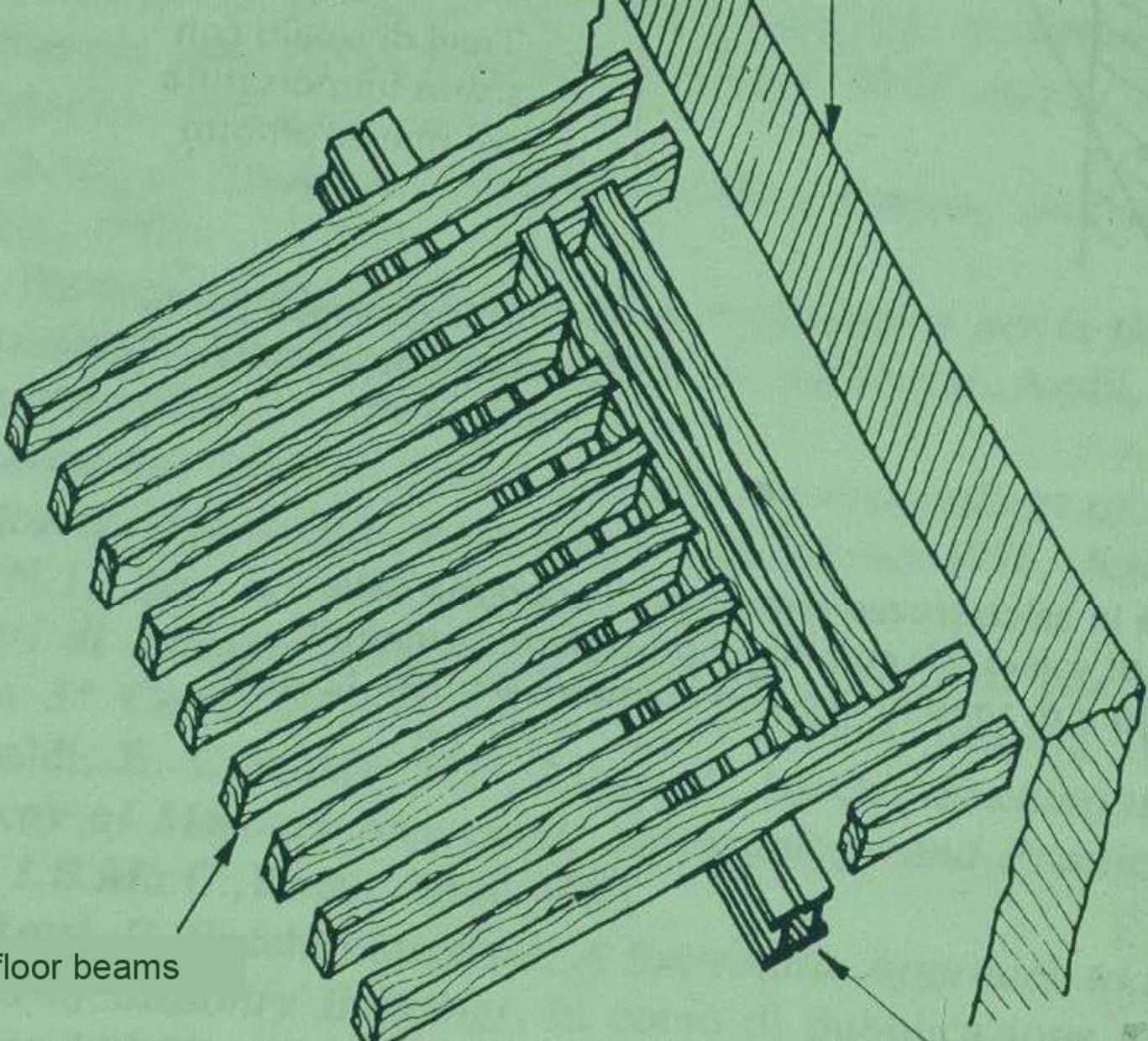


EXTERNAL REINFORCEMENTS WOODEN STRUCTURES

Reinforced concrete beam for the support of wooden floor beams

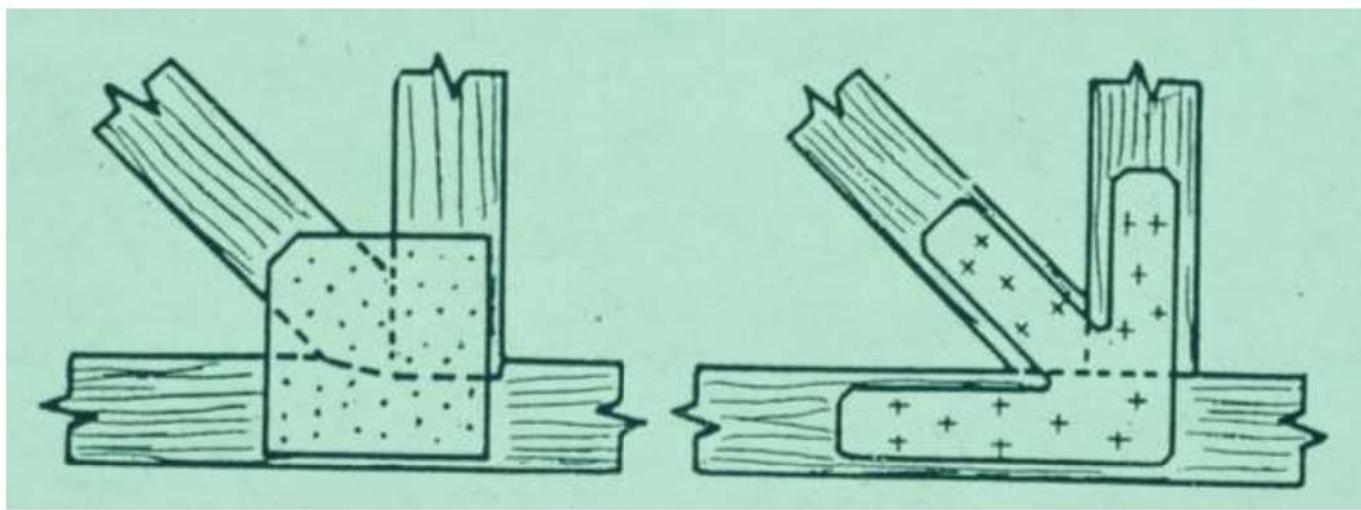


**EXTERNAL REINFORCEMENTS
WOODEN STRUCTURES**



Steel beam for the support of wooden floor beams

EXTERNAL REINFORCEMENTS WOODEN STRUCTURES



**EXTERNAL REINFORCEMENTS. JOINTS
WOODEN STRUCTURES**



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Key Action 2: Strategic Partnership Projects
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