

An aerial photograph of a valley. The foreground and middle ground are dominated by a patchwork of agricultural fields in various shades of green and brown, separated by dark lines representing roads or ditches. In the lower center, a town is visible, with a dense cluster of buildings and a large, light-colored area that appears to be a construction site or a large open lot. The background consists of steep, forested hillsides. The overall scene suggests a rural area that has been affected by a disaster, likely an earthquake, given the context of the text.

# Ricostruire dopo il terremoto

## Scenari noti

*Messina 1908*

*Abruzzo (Avezzano) 1915*

*Romagna 1916*

*Citerna-Monterchi (Arezzo) 1917*

*Mugello 1918*

*Garfagnana 1919*

*Belice 1968*

*Friuli 1976*

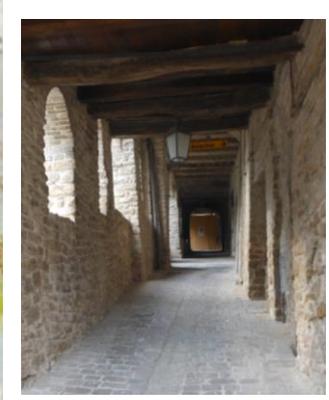
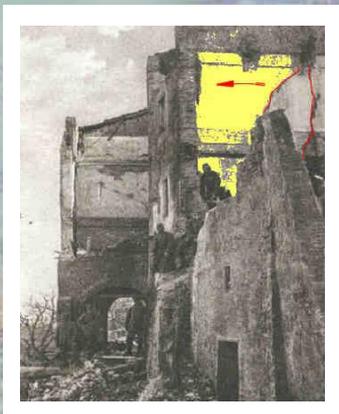
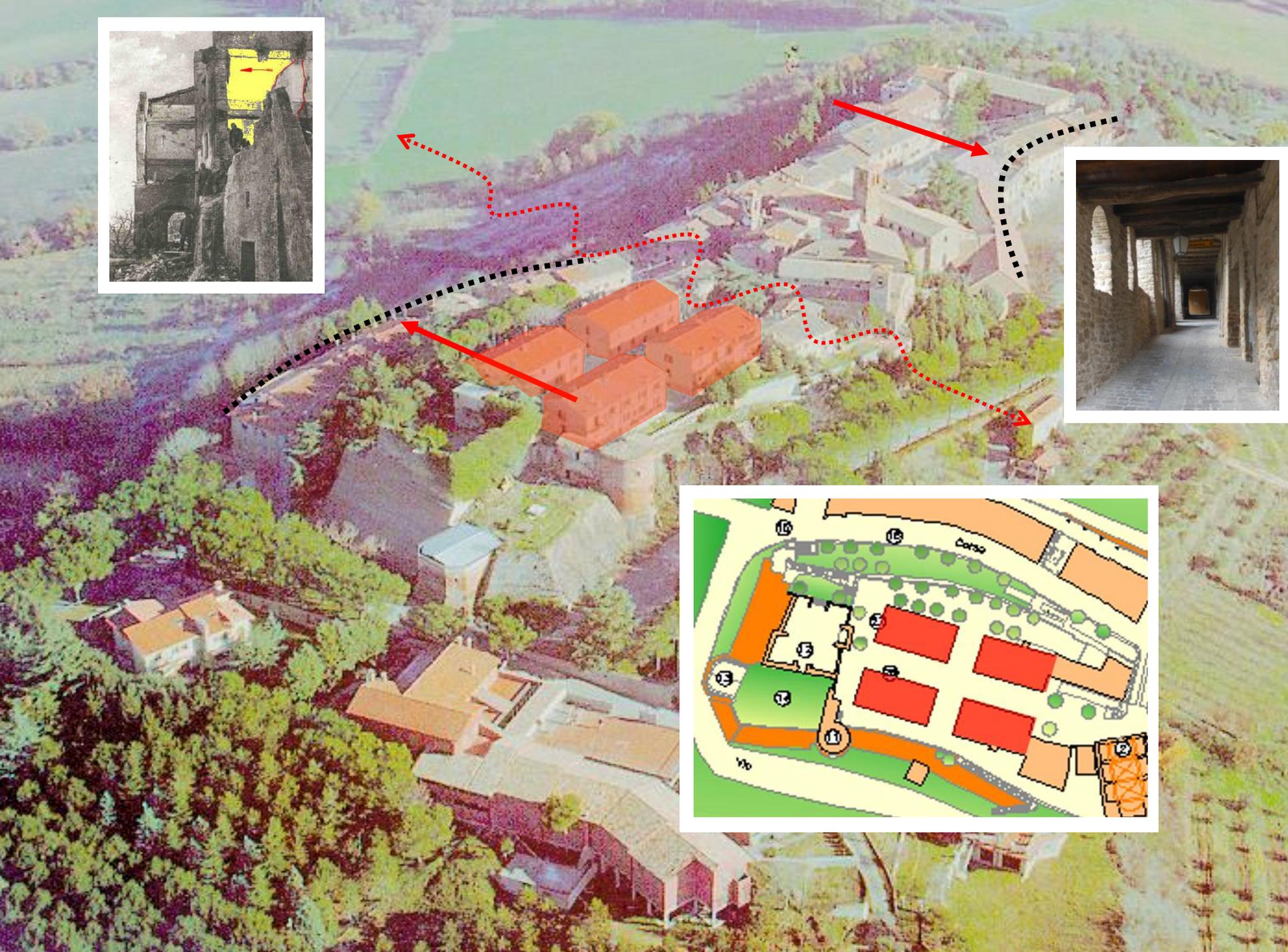
*Irpinia 1980*

*Umbria-Marche 1978-1997*

*Molise 2002*

*Abruzzo 2009*

*Emilia 2012*





Friuli, 1976 (Venzone)



Poggioreale di Sicilia – Belice (TP)



Gibellina – Belice (TP)





Cerreto Sannita

## Come intervenire?

Ricostruzione ex-novo

*Tecniche costruttive:*

*Muratura (ordinaria e armata)*

*Cemento armato*

*Legno*

*Acciaio*

*Sistemi misti*

Riparazione e consolidamento

*Miglioramento sismico*

*Adeguamento sismico*

## Nuove tecnologie e tecniche tradizionali



Tecnologia X-LAM  
Pannelli di legno multistrato con funzioni portanti



Tecnologia del cemento armato



Tecnologia dell'acciaio e legno  
o pannelli in cemento armato



Tecnologia della muratura armata

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*Sistemi misti*

Riparazione e consolidamento

*Miglioramento sismico*

*Adeguamento sismico*

*Analizzare la risposta  
sismica degli edifici*

Trarre esperienza dall'osservazione:  
un esempio significativo



Architettura barocca Siciliana (Scicli)



Chiesa paleocristiana presso le  
Terme di Diocleziano a Cotilia (Rieti)



Torre di Babele



Ziqqurat (Persia)



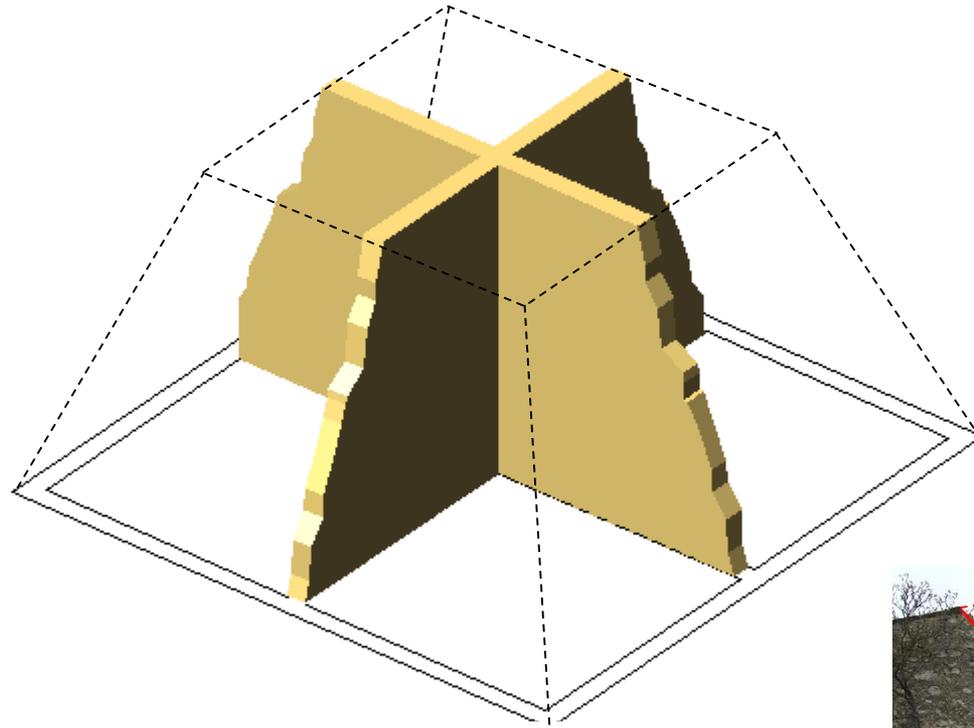
Piramidi egizie

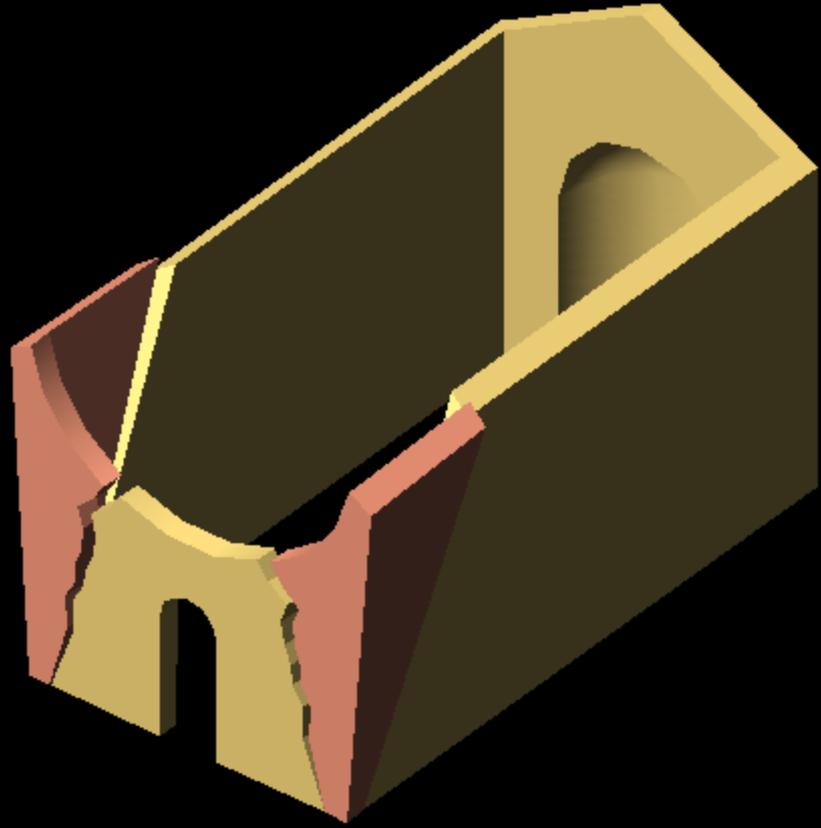


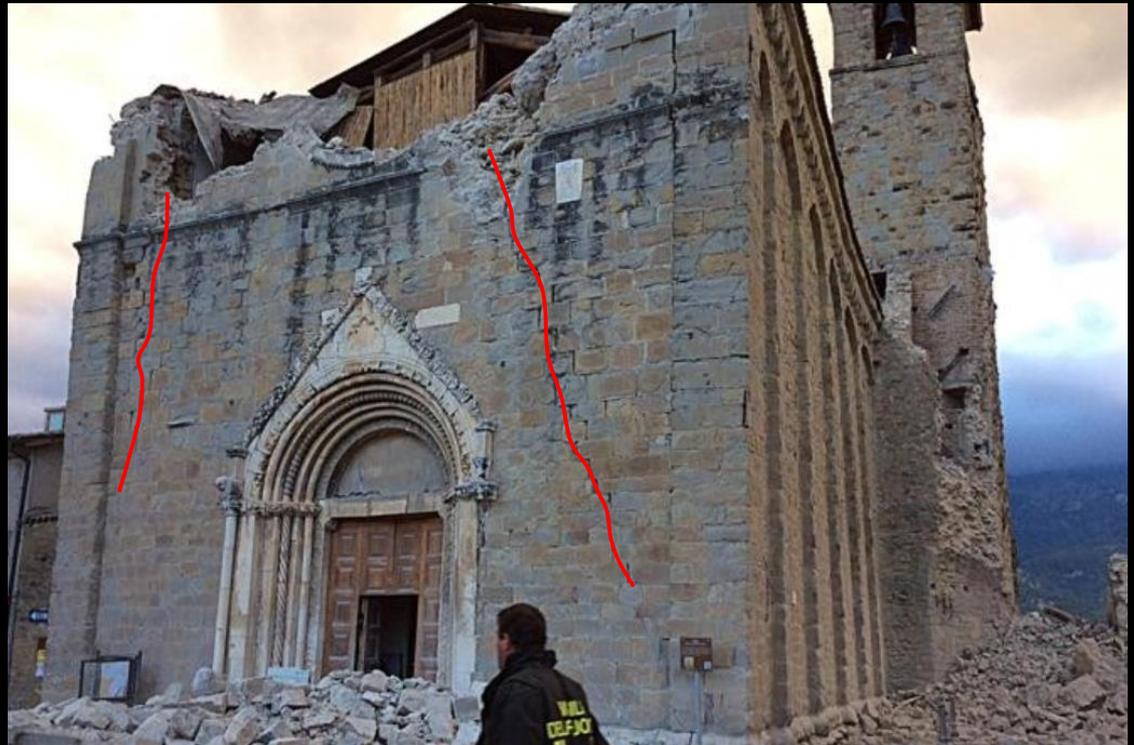
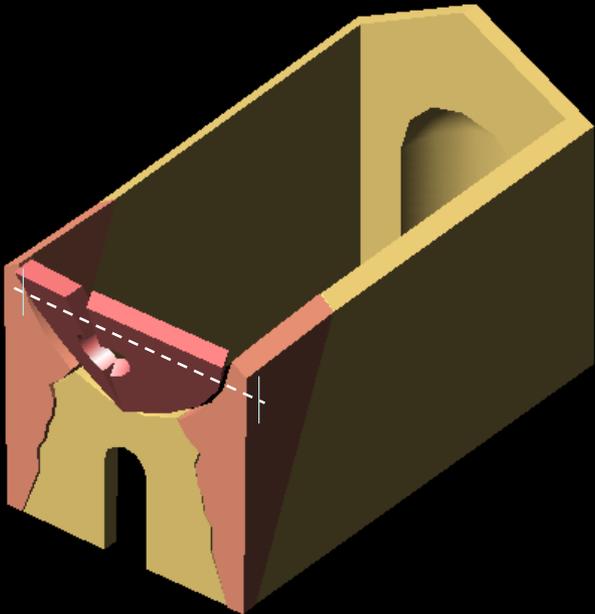
Piramidi Maia

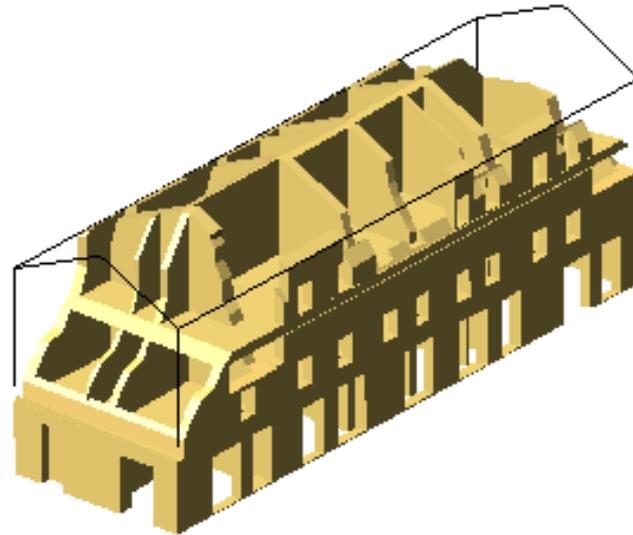


Castelli giapponesi

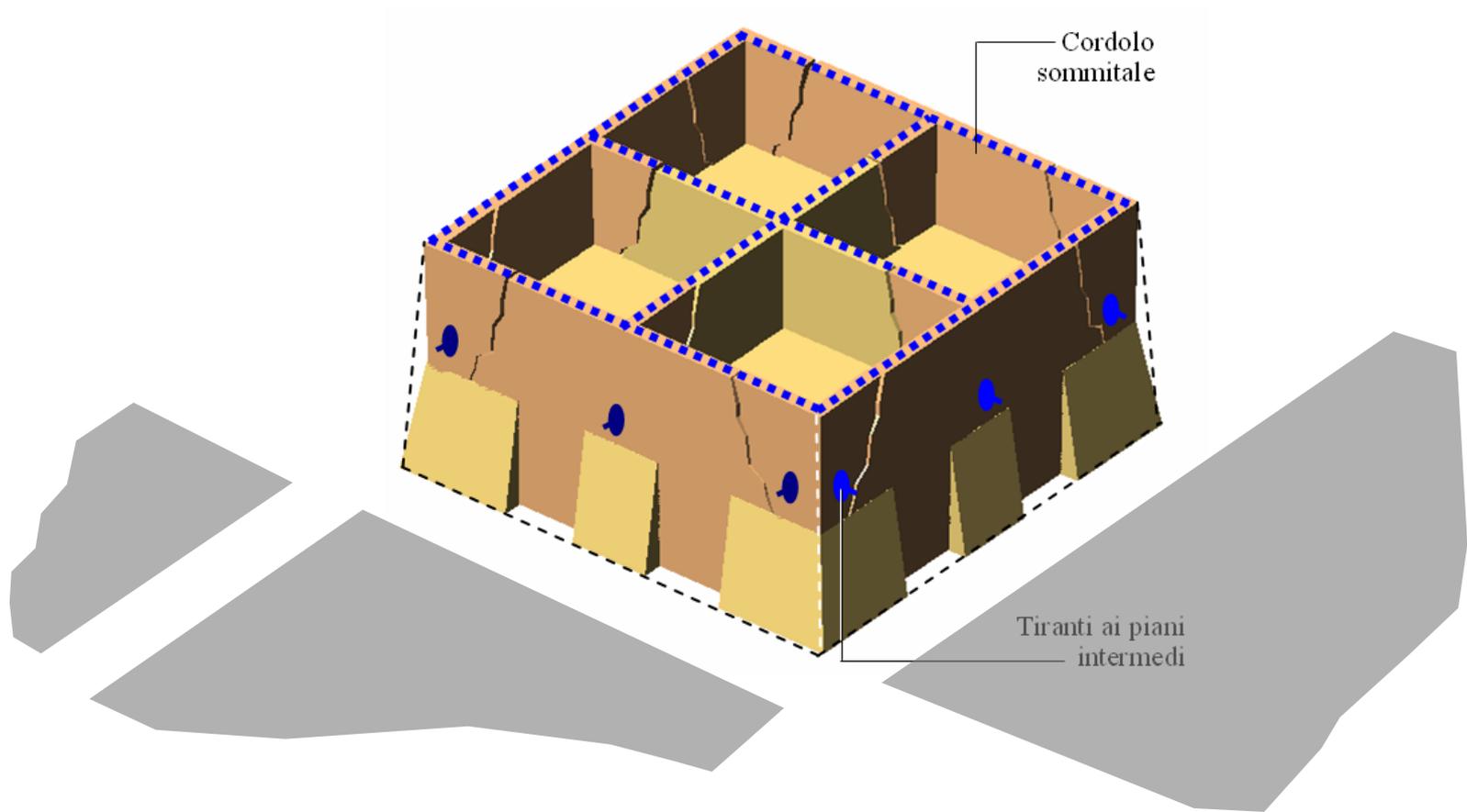






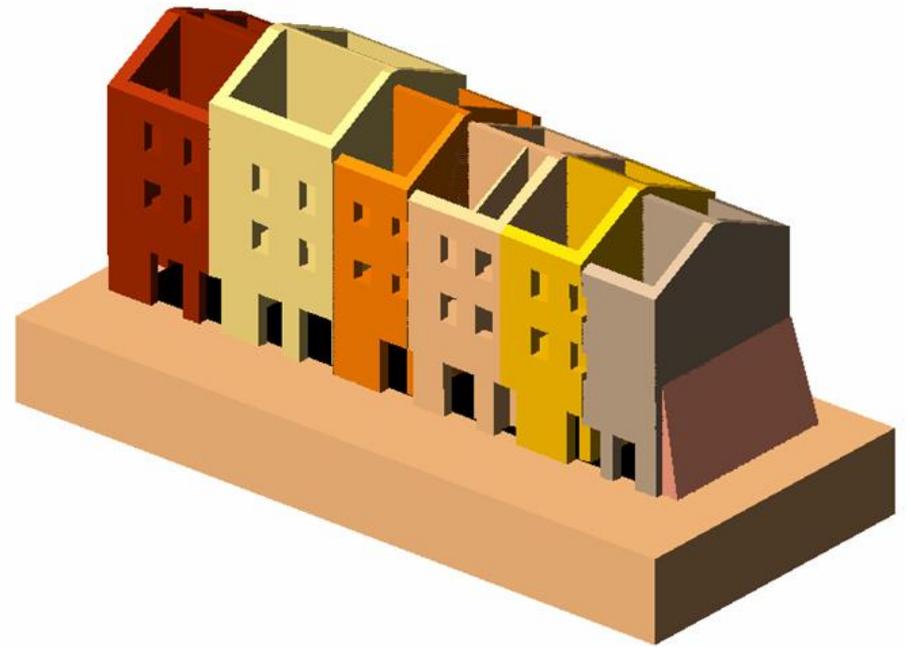


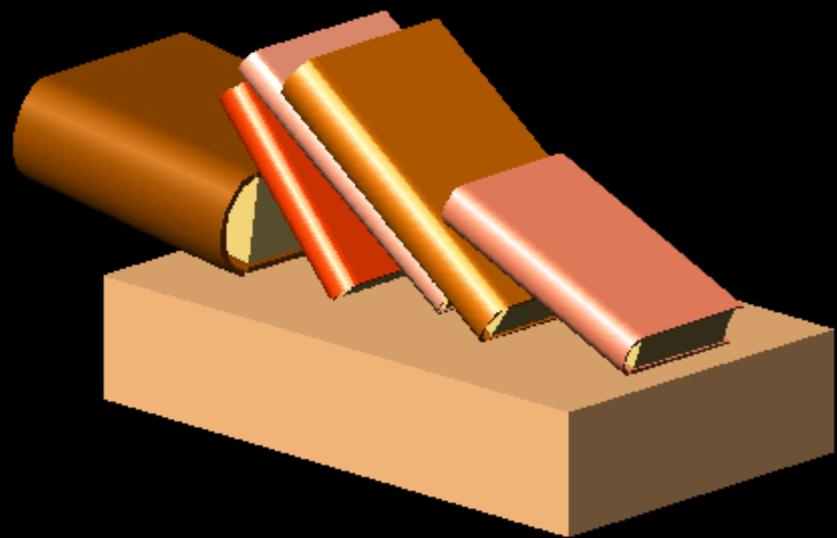
Edilizia a schiera lineare



Cordolo  
sommitale

Tiranti ai piani  
intermedi







Trarre esperienza dall'osservazione

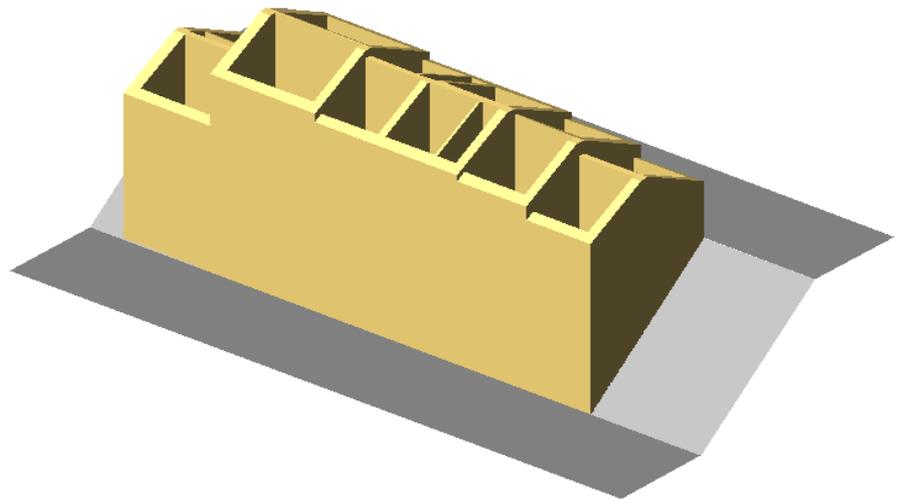
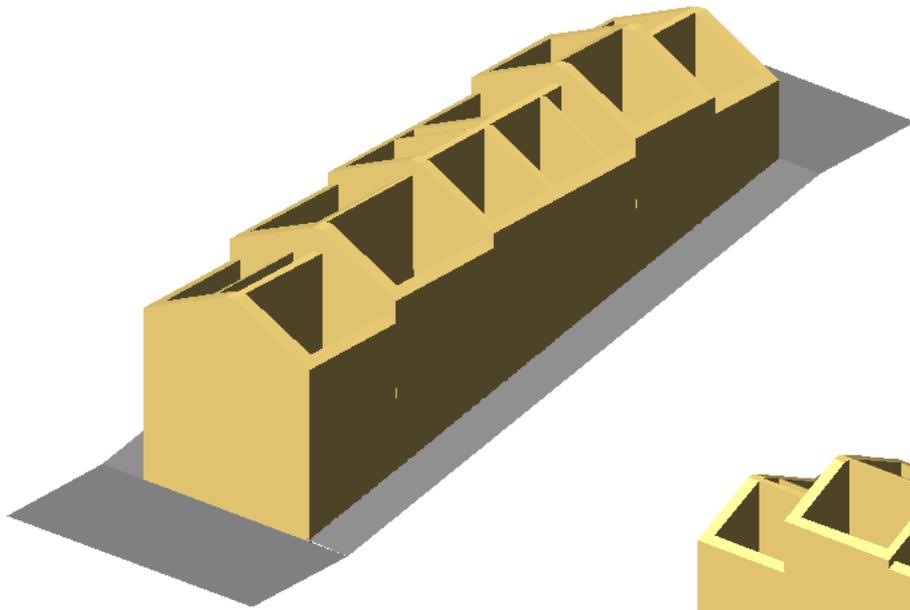


L'Aquila (Onna) – 6 aprile 2009

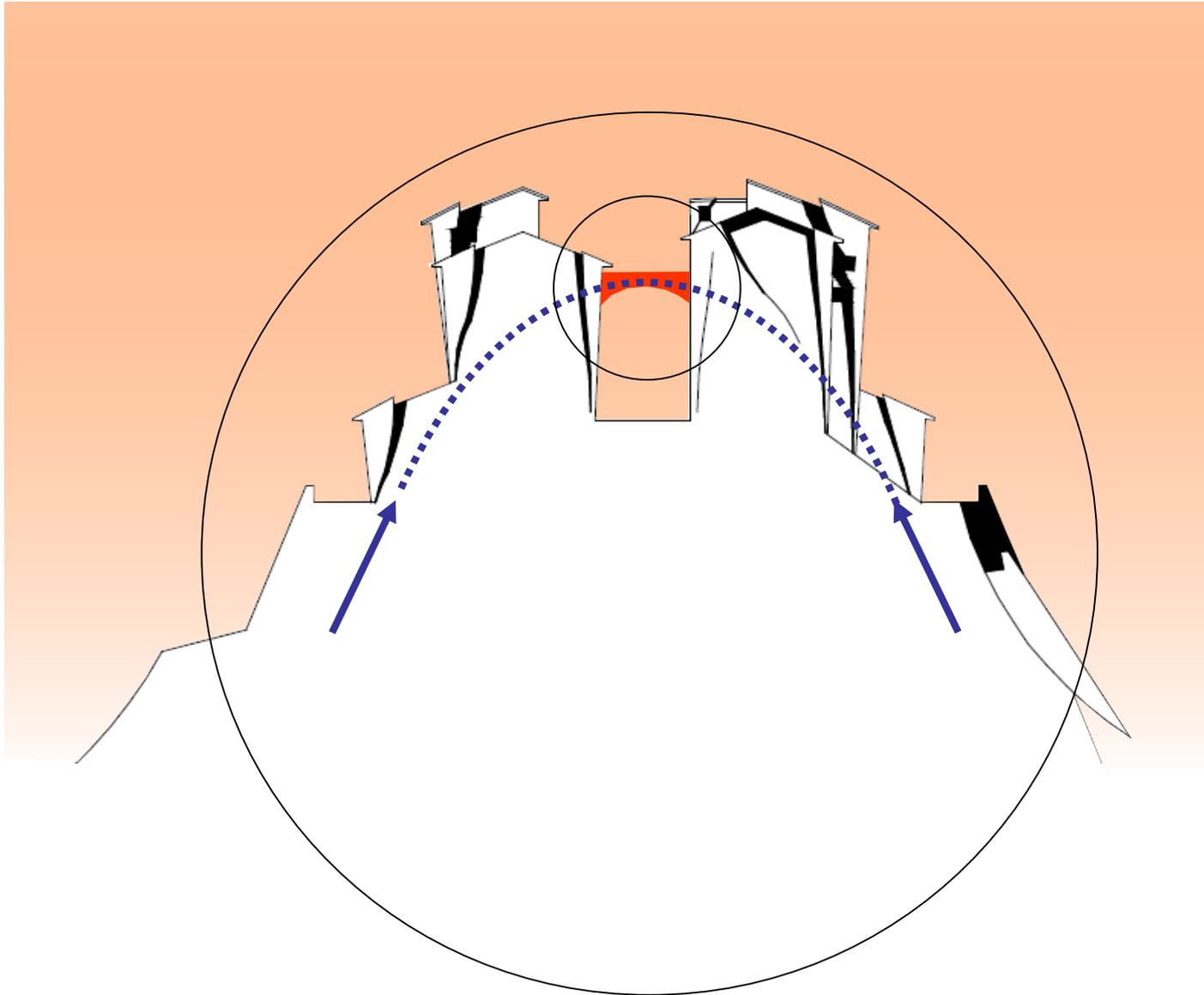


**Unità minime d'intervento**

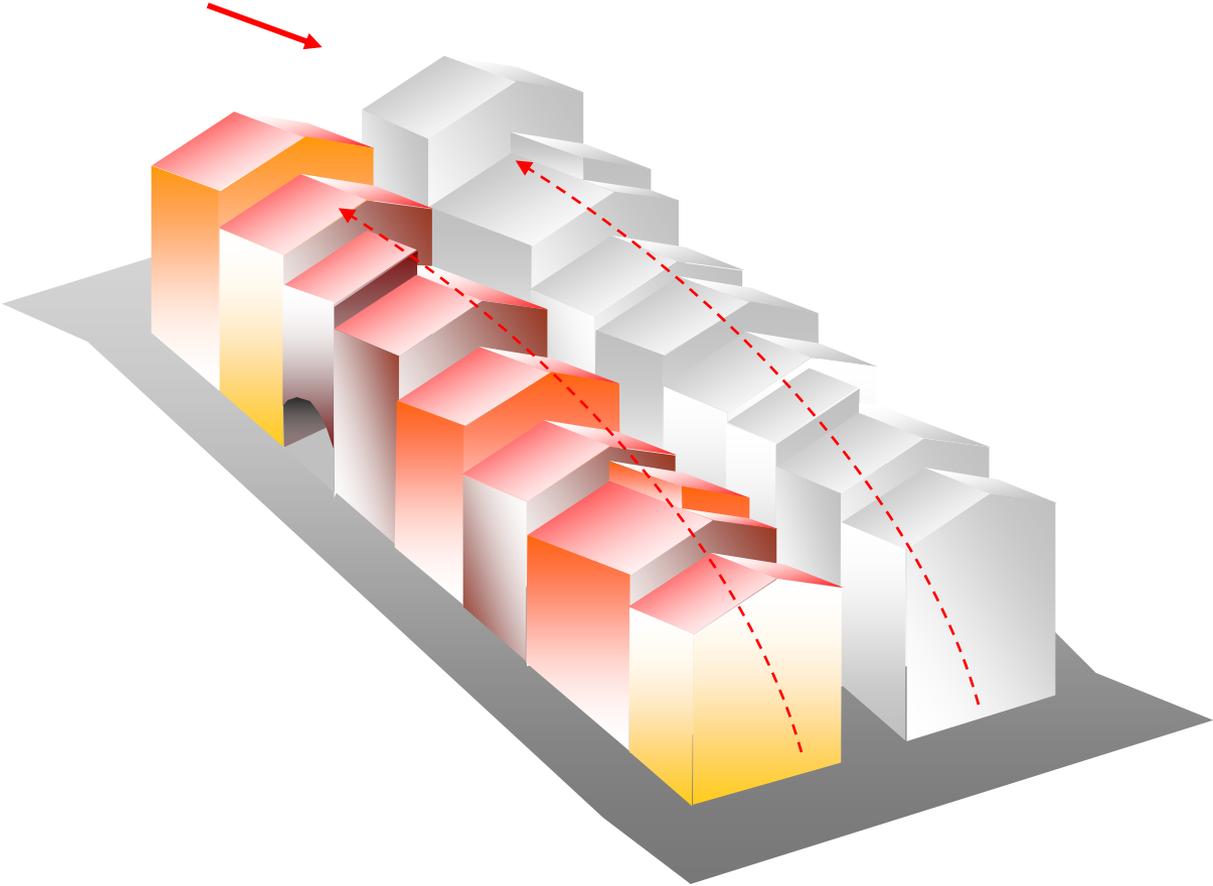
**Unità minime di analisi**



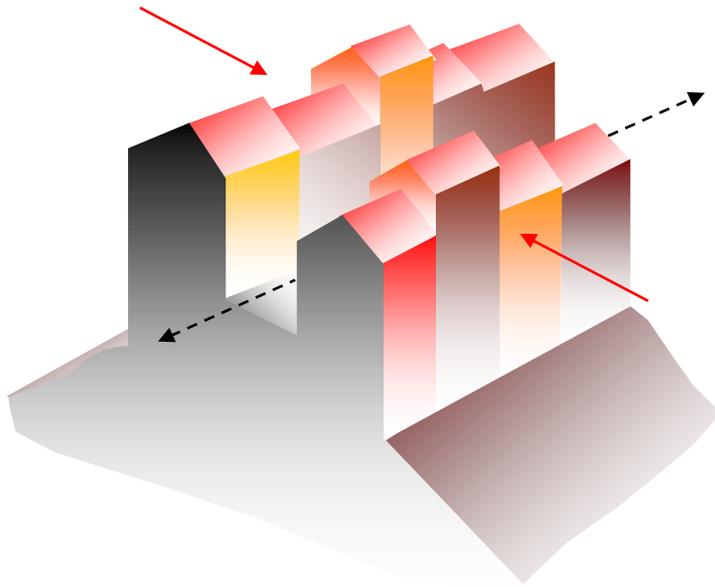
# Valutazione del rischio sismico alla scala urbana



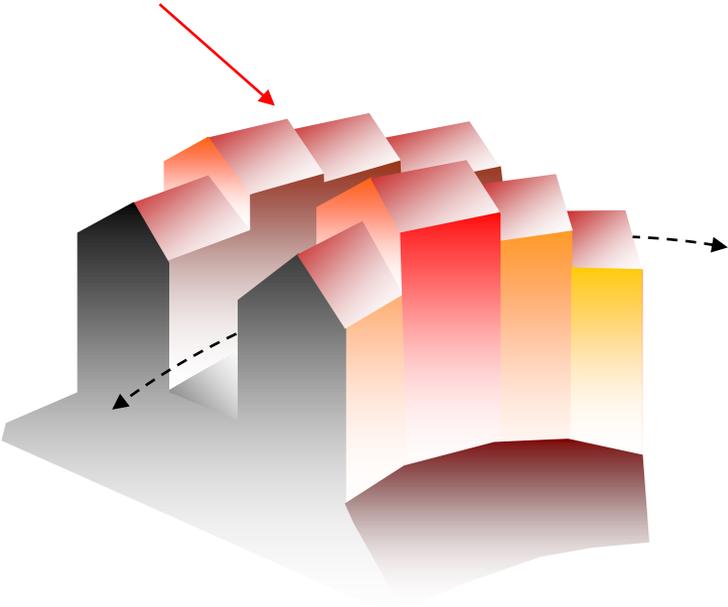
# Valutazione del rischio sismico alla scala urbana



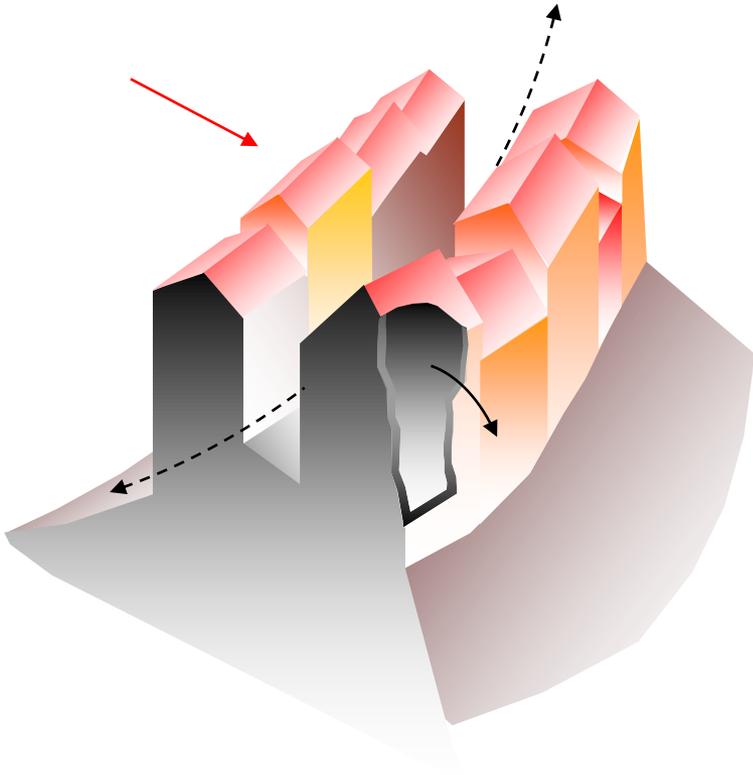
# Valutazione del rischio sismico alla scala urbana



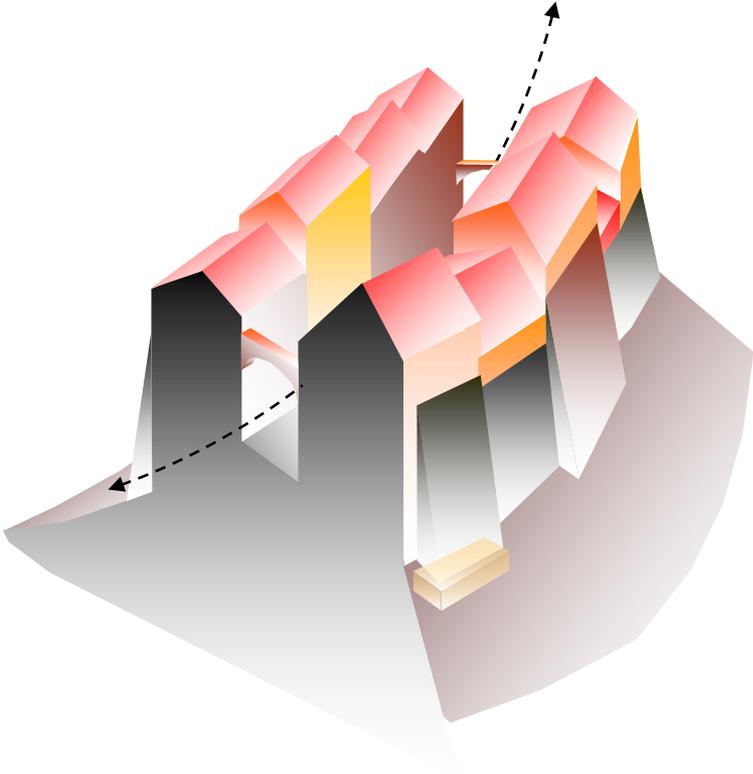
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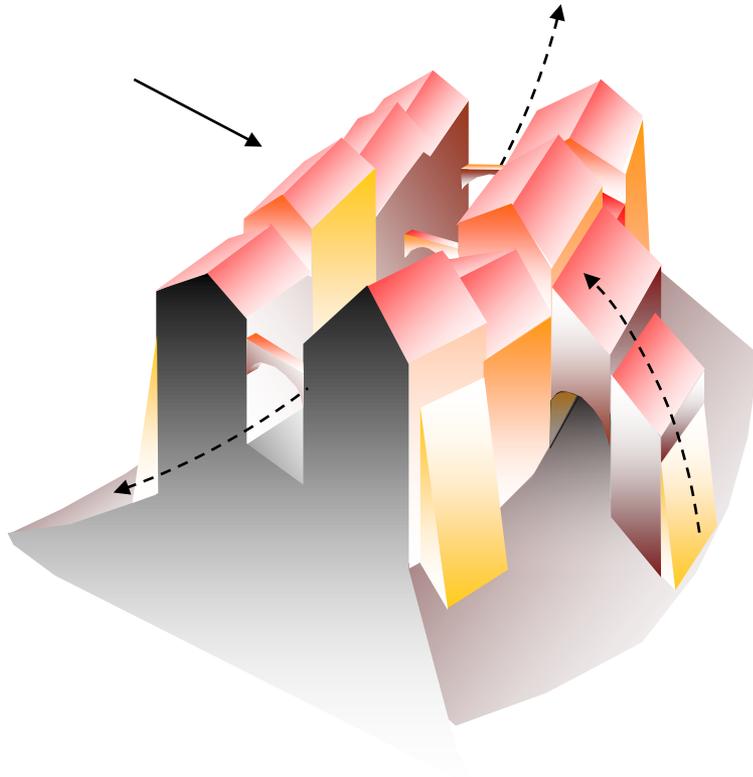
# Valutazione del rischio sismico alla scala urbana



# Valutazione del rischio sismico alla scala urbana

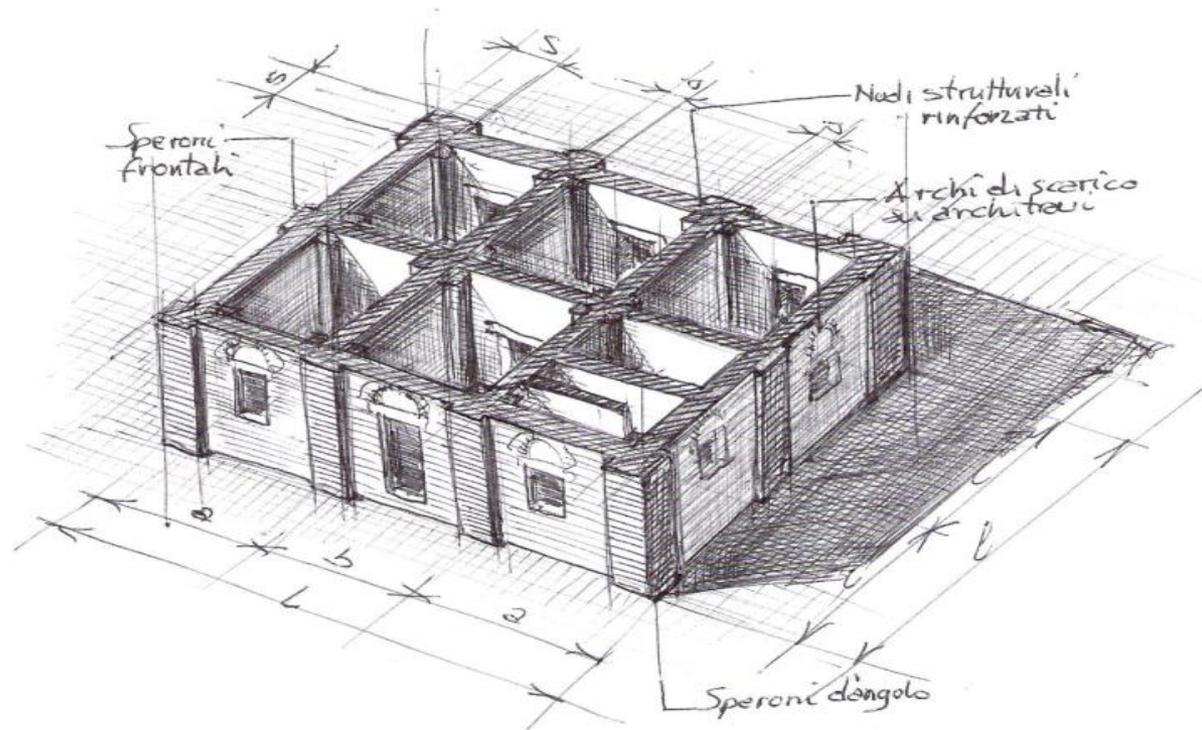


# Valutazione del rischio sismico alla scala urbana



## Valutazione del rischio sismico alla scala edilizia

Progetto di “casa antisismica” elaborato dopo il terremoto del 1570 a Ferrara dall’architetto Pirro Ligorio, succeduto a Michelangelo presso la Fabbrica di San Pietro e trasferitosi alla corte degli Estensi nel 1568.



## Valutazione del rischio sismico alla scala edilizia



Emilia (maggio 2012):  
ribaltamento di pareti sollecitate da azioni ortogonali

## Valutazione del rischio sismico alla scala costruttiva



Tecniche antisismiche premoderne



Fraz. Sant'Angelo di Amatrice





## Meccanismi prevedibili



Strappo e ribaltamento dei cantonali



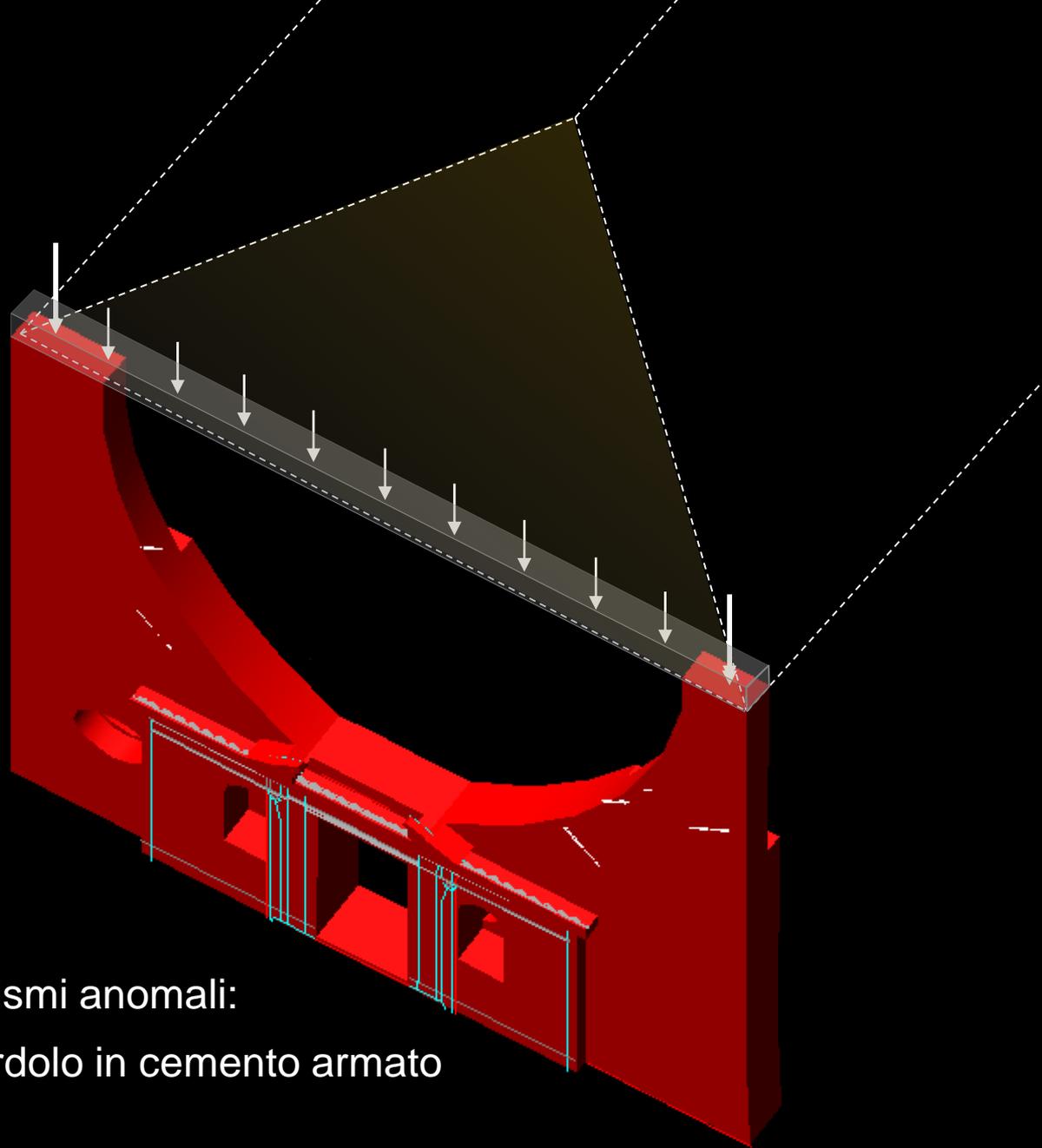
## Meccanismi anomali

tipici degli edifici in muratura tradizionale con tetti in cemento armato



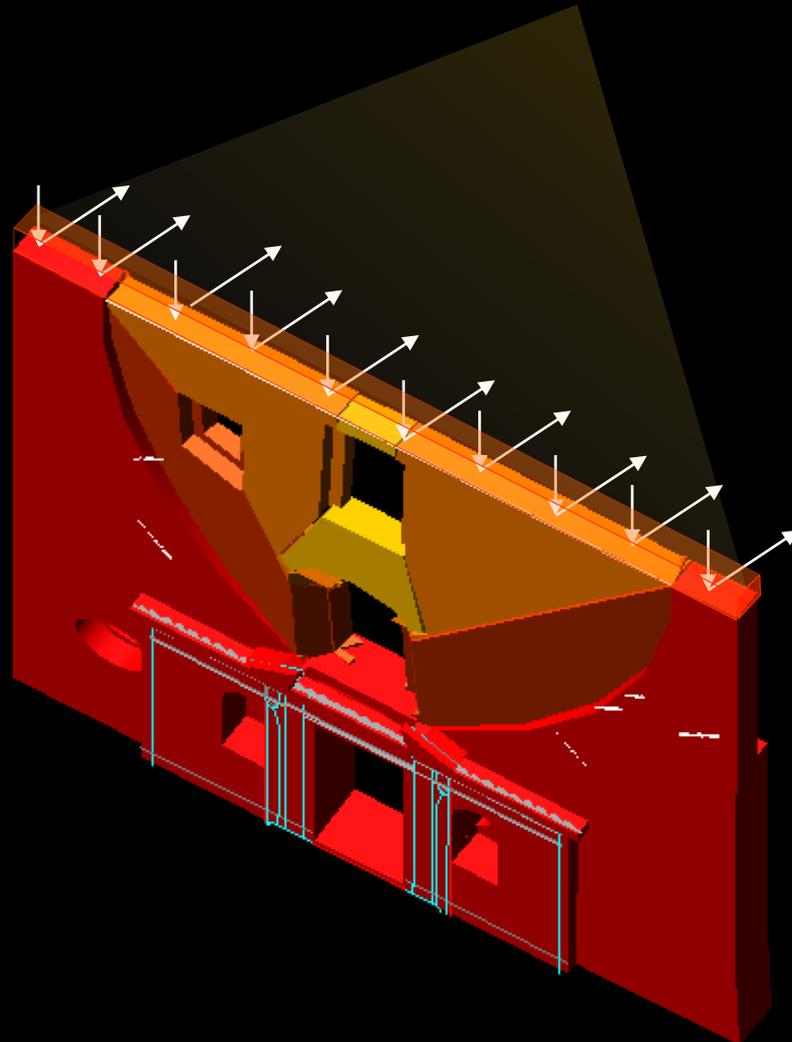
Il cemento armato nell'edilizia storica



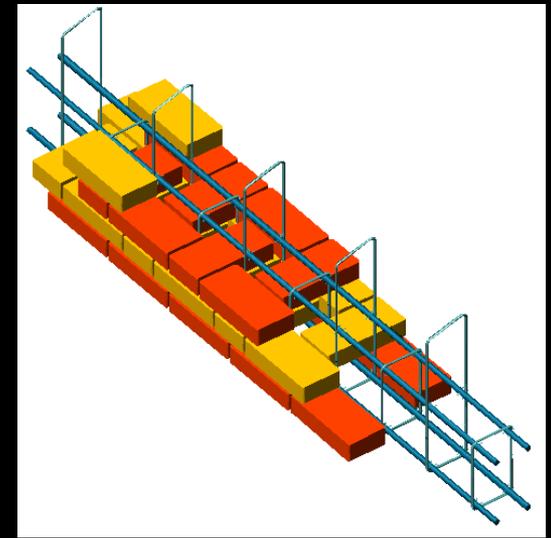


Meccanismi anomali:

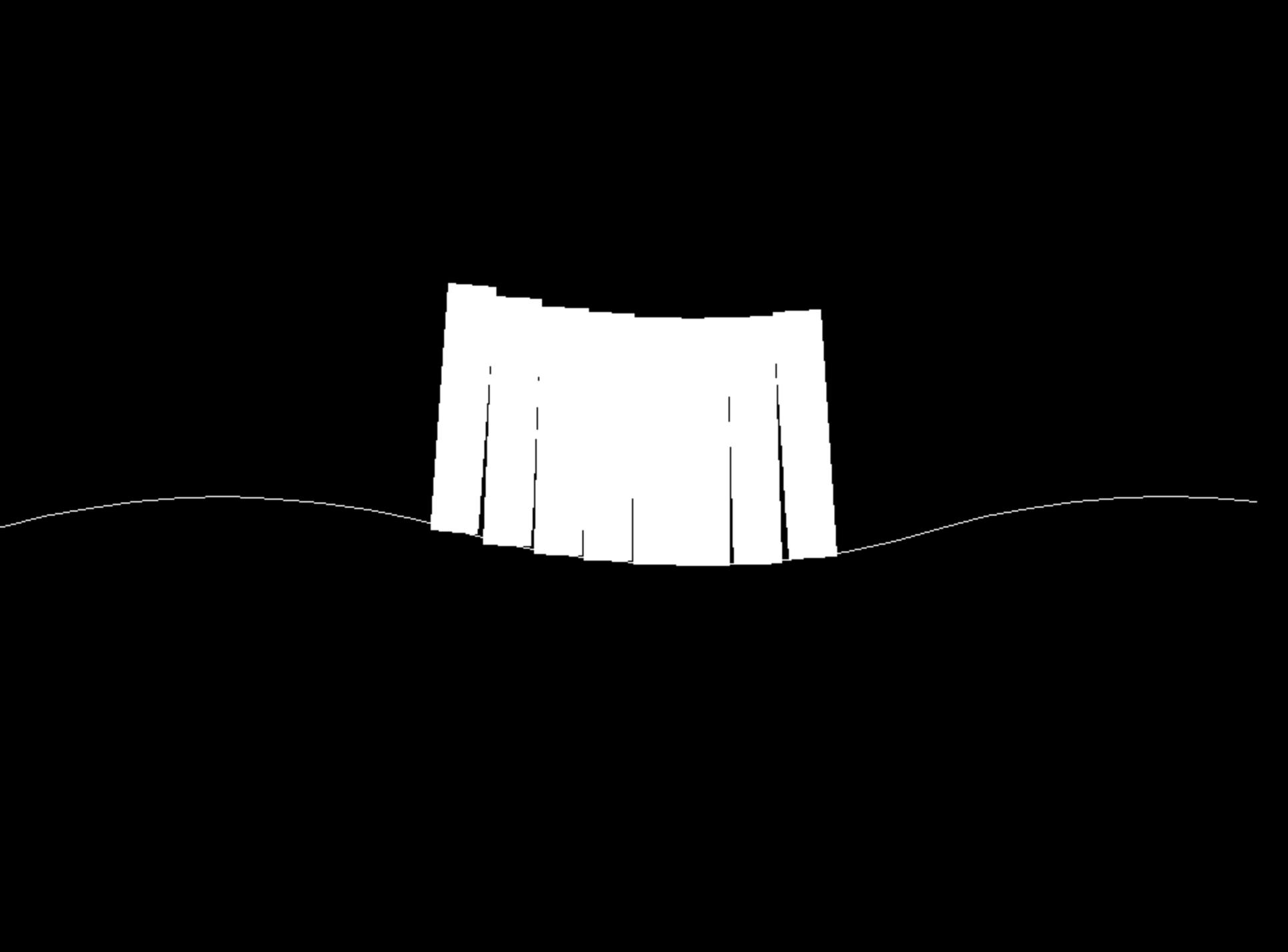
«effetto trave» del cordolo in cemento armato

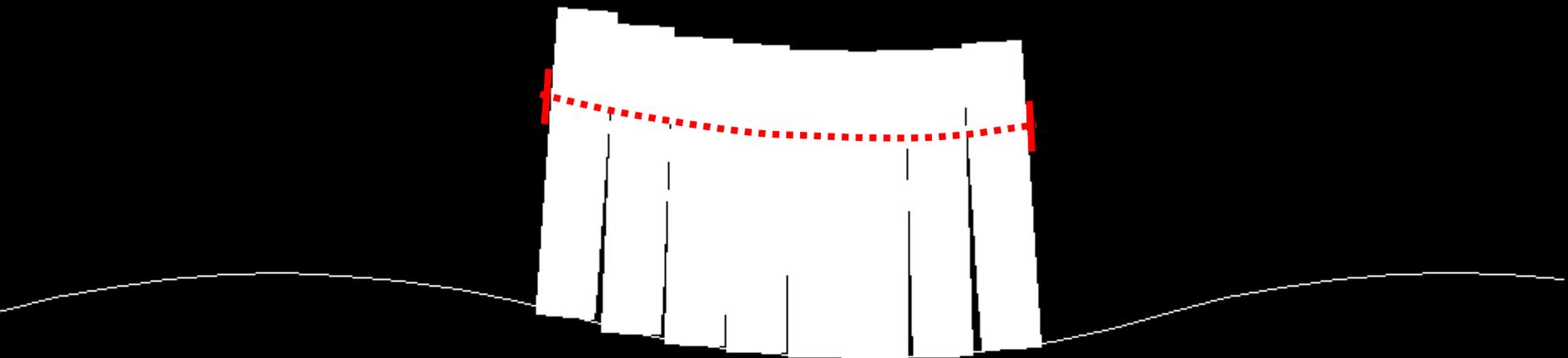


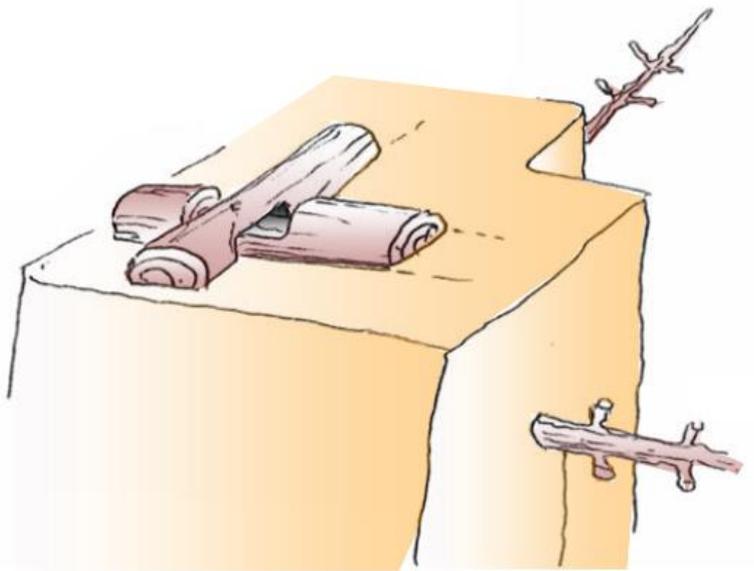
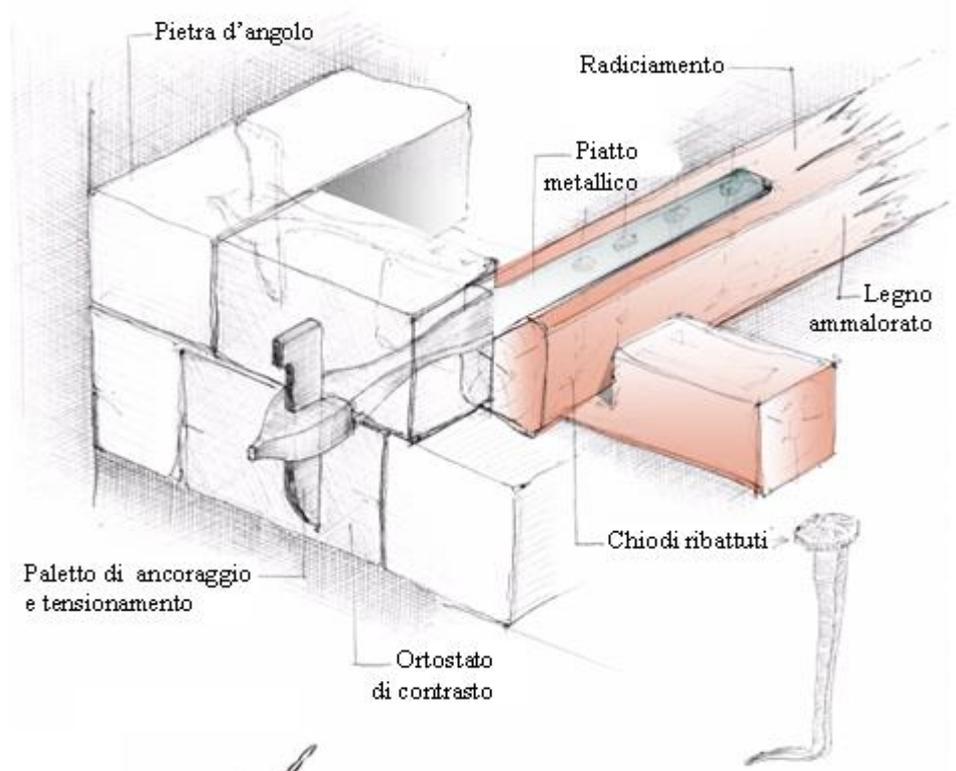
Cordolo in  
muratura armata











An aerial photograph showing a rural landscape. The top half of the image is dominated by a dense, dark green forest. Below the forest, a patchwork of green and brown agricultural fields is visible, separated by thin lines of trees and roads. In the center of the image, there is a small cluster of buildings, likely a village or farmstead, with some structures appearing to be in various stages of reconstruction or repair. The overall scene suggests a rural area recovering from a disaster, likely an earthquake as indicated by the text.

# Ricostruire dopo il terremoto