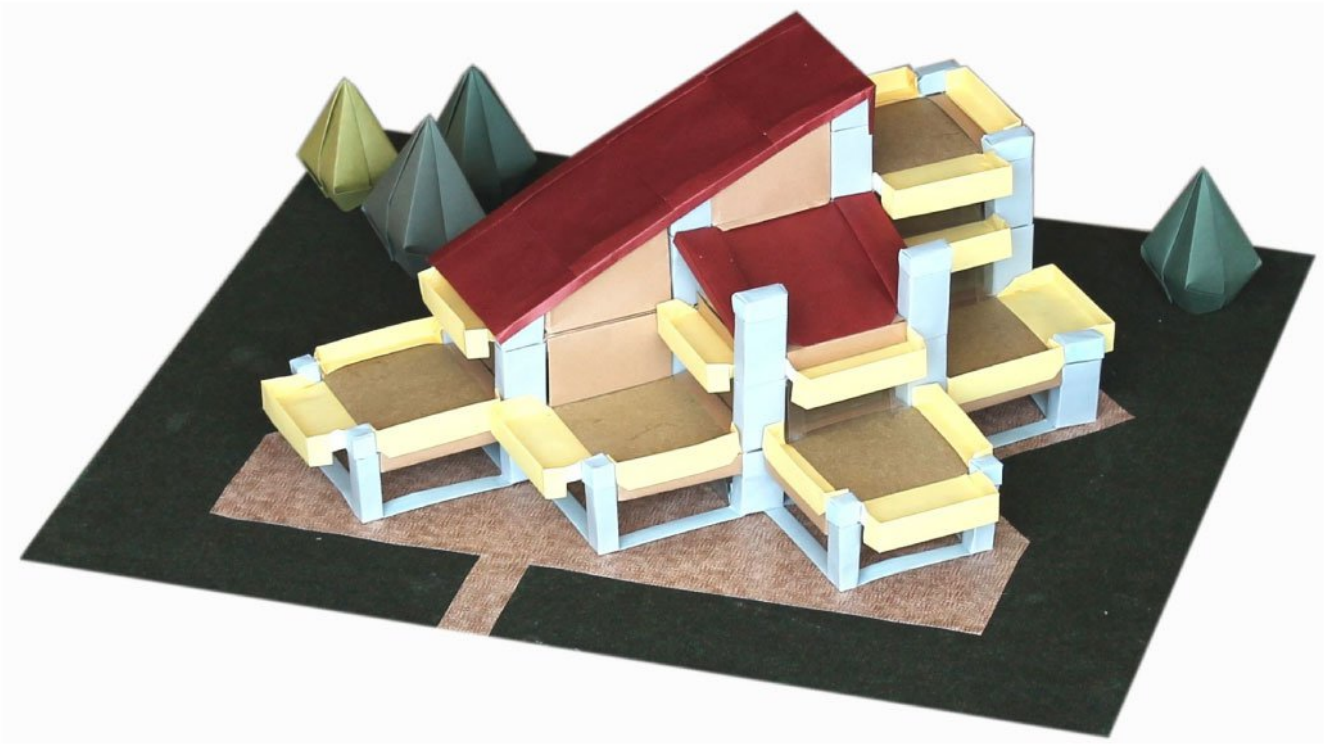
MANUALE DELL'ARCHITETTO

aggiornamento luglio 2016

ORIGAMISTA

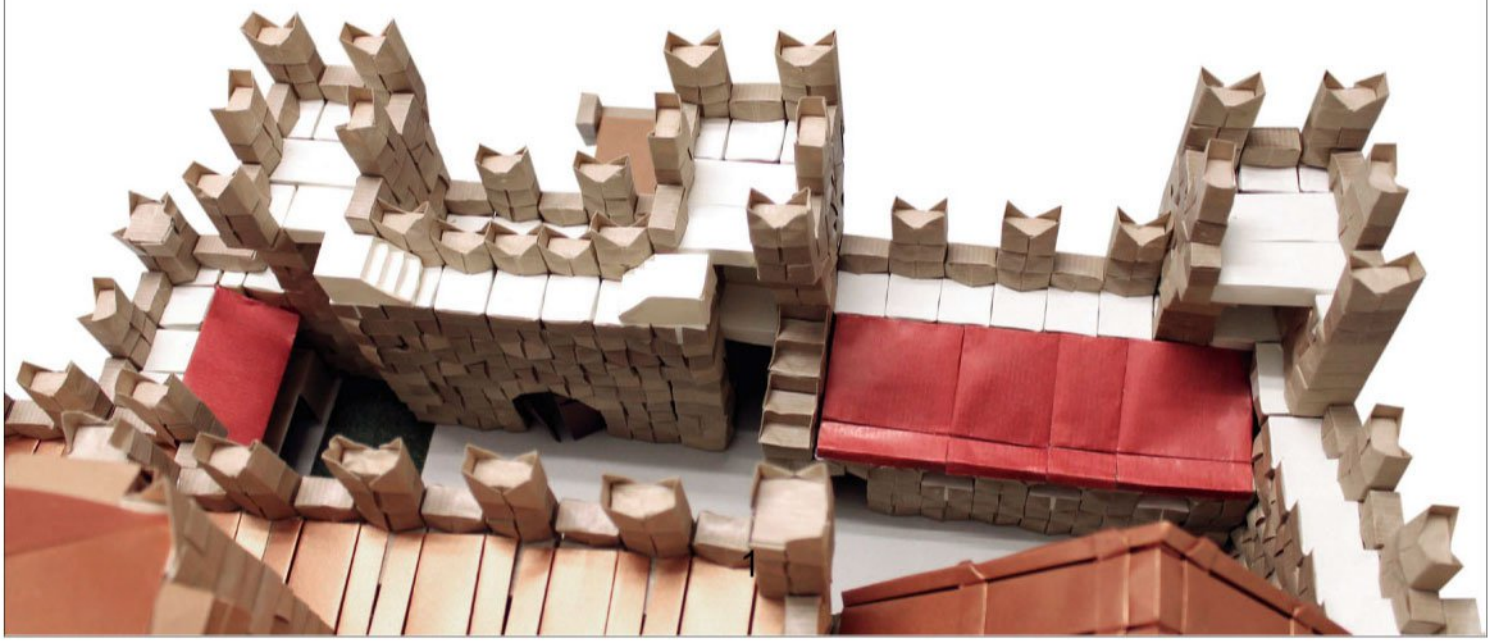


Franco Pavarin

www.aereiemaschereorigami.altervista.org

Franco Pavarin

MANUALE DELL'ARCHITETTO ORIGAMISTA



Presentazione

Attualmente le tecniche origamistiche consentono la realizzazione di quasi ogni cosa, con una vistosa lacuna: le strutture architettoniche.

Con questo manuale mi propongo l'ambizioso obbiettivo di colmare questa lacuna.

Data la vastità dell'argomento, ho pensato, similmente a quanto avviene nel mondo dell'edilizia, ad un manuale aggiornabile ed integrabile periodicamente.

Questo manuale ingloba il lavoro originariamente denominato "Legorigami 1", dedicato all'architettura antica, e sviluppa il tema dell'architettura contemporanea.

Con aggiornamenti successivi, pubblicati nel mio sito, mi propongo di trattare ulteriori strutture, come gli anfiteatri e le strutture reticolari.

Sicuro dell'interesse che susciterà in molti origamisti, pubblicherò versioni del manuale in lingua inglese, francese e spagnola.

Con questo manuale intendo anche avviare un percorso specifico nell'ambito dell'origami "sociale".

Per origami "sociale" intendo un uso delle tecniche origamistiche finalizzato ad una attività di gruppo sviluppabile in qualunque ambiente o località utilizzando solamente un materiale economico: la carta. Praticata con i ragazzi è specifica= tamente educativa perchè favorisce l'apprendimento delle regole del lavoro d'equipe.

Attualmente l'origami è un'attività artigianale-artistica limitata ad un numero ristretto di appassionati, se si fa eccezione per la realizzazione di aerei di carta, divertimento per persone di ogni età.

Libri adatti per il lavoro di gruppo non ne esistono molti; fra tutti merita di essere menzionato il famoso "Origami modulare" di Tomoko Fuse".

Con questo libro intendo fornire i rudimenti per un'attività organizzata da un operatore, finalizzata a stimolare nei piegatori non solo la manualità e la precisione, ma anche il ragionamento e la fantasia.

Infatti, appresa la tecnica per la costruzione dei blocchi base, il piegatore può sbizzarrirsi nella scelta della forma da realizzare.

Quindi l'organizzatore dell'attività può dedicarsi a seguire i singoli o i gruppi nei passaggi più impegnativi o nella costruzione dei pezzi speciali.

Utilizzando solo foglietti della medesima dimensione, sispiegano i sistemi costruttivi per la realizzazione di edifici, nonchè i riferimenti utili per l'insegnante per trattare temi relativi all'architettura militare e religiosa medioevale.

Con questo sistema di costruzione tridimensionale il primo risultato ottenibile con l'apprendimento della tecnica origami è il miglioramento della manualità ma appare evidente che più importante ancora è lo sviluppo della progettualità di ogni individuo.

Mi spiego meglio: appresa la procedura di realizzazione dei blocchi e degli elementi base, il piegatore esprime la propria progettualità nella scelta della forma da rappresentare e procede analogamente a come farebbe se avesse a disposizione i fantastici elementi da costruzione in plastica.

Escludendo forme circolari, l'origamista può addirittura stilare un progetto architettonico su foglio quadrettato completo di piante e prospetti, comprensivo di elementi complessi come navate, transetto, abside, nartece, matronei, ecc.

Giugno 2015 Arch. Franco Pavarin

Consigli tecnici

Il materiale da adoperare, soprattutto se i blocchetti sono di grandi dimensioni e/o da usare più volte deve essere una carta robusta o meglio un cartoncino leggero.

Per la realizzazione del castello raffigurato in copertina, data la complessità dell'opera e la necessità di trasportarlo, ho ricavato dei quadrati molto piccoli, ritagliandoli con taglierino e riga, da carta da pacchi di differenti tonalità, pre= ventivamente sovrapposta più volte.

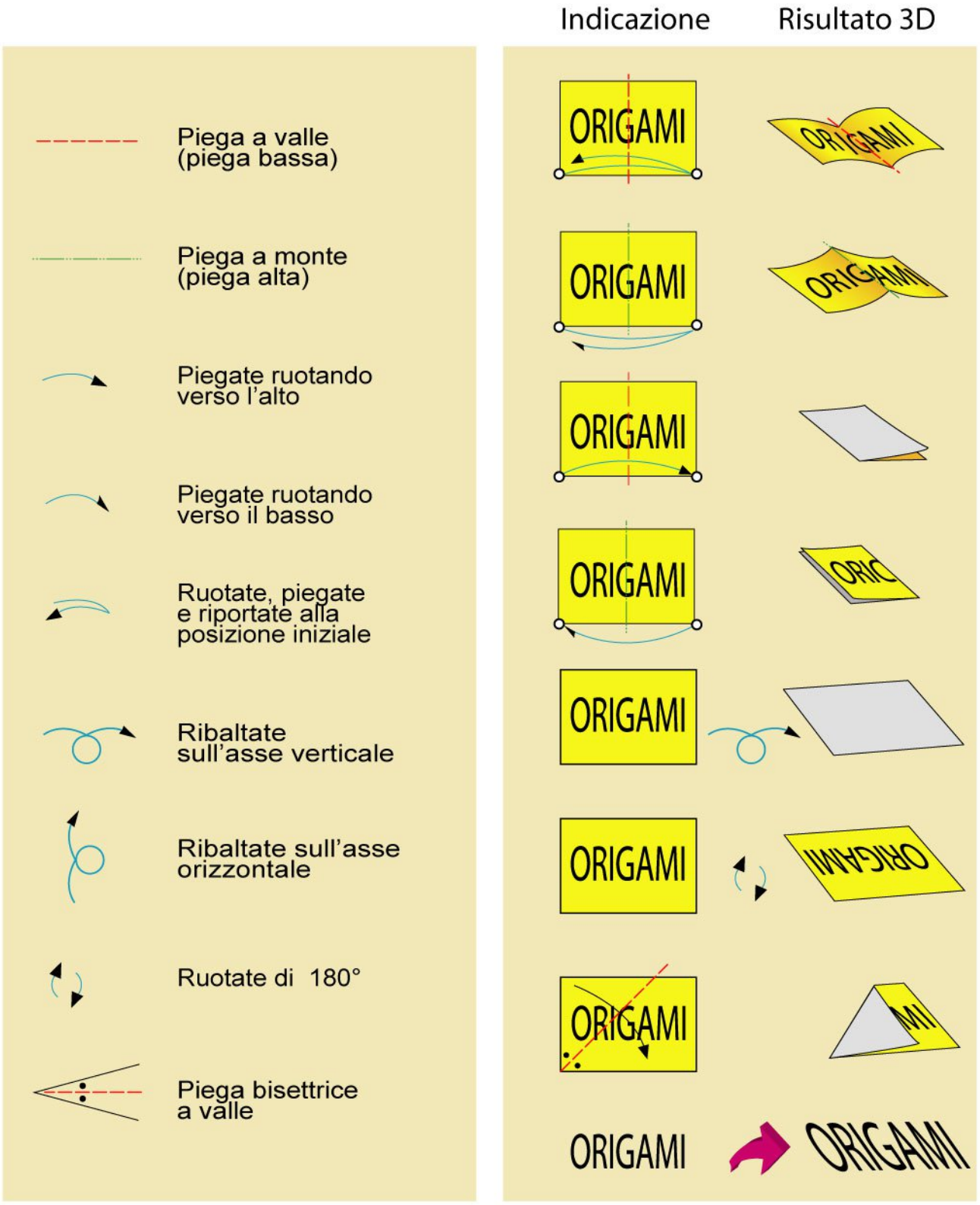
Ho provveduto alla progettazione del castello schizzando a mano libera i prospetti di tutte le facciate e della pianta su foglio quadrettato, fissando la scala di rappresentazione: 1 quadretto =1 metro nella realtà =1/8 del foglietto di 8 cm di lato.

Ipotizziamo di voler realizzare un edificio in scala reale: partendo da fogli di cartoncino di 1 m di lato, otterremmo dei blocchi base di cm 25x25x12,5 cm, quindi per realizzare 1 mq di parete occorrerebbero i seguenti blocchi: (100x100)/(12,5x25) =32 blocchi.

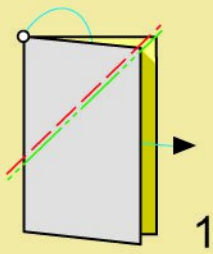
Le aperture, porte e finestre, risulterebbero larghe al massimo quanto per= messo dall'architrave, cioè 25x3=75 cm.

Ovviamente, se l'edificio costruito fosse a più piani, non sarebbe consigliabile salire al piano superiore.

Simbologia origami

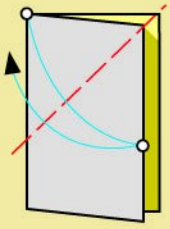


Realizzazione delle pieghe rovesce



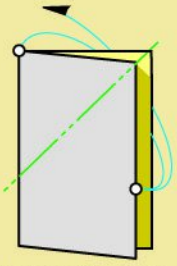
1

Eseguite una piega rovescia interna



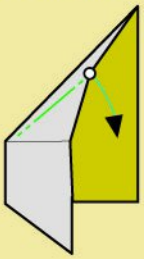
2

Una piega a valle



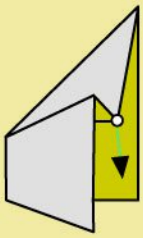
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Ripiegate con piega a monte sulla medesima traccia



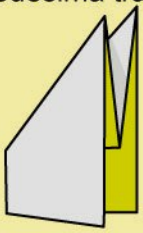
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Aprite e rovesciate il verso della piega



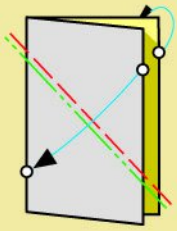
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Inserite all' interno il vertice indicato



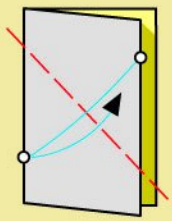
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Piega rovescia interna ultimata



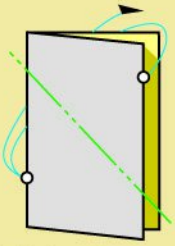
1

Eseguite una piega rovescia esterna



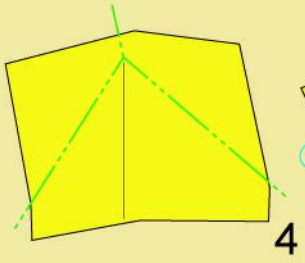
2

Una piega a valle



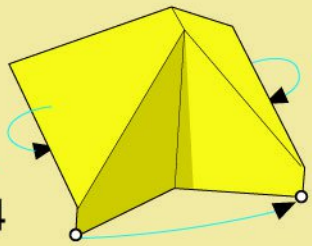
3

Ripiegate con piega a monte sulla medesima traccia



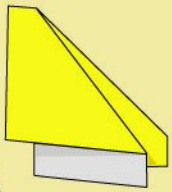
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Aprite e rovesciate il verso della piega



5

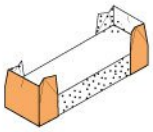
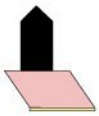
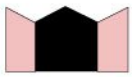
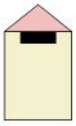
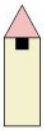
Richiudete

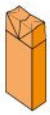
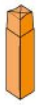
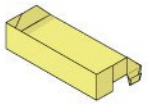
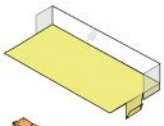
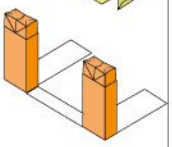
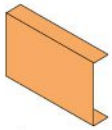
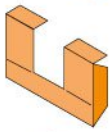
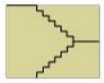


6

Piega rovescia esterna ultimata

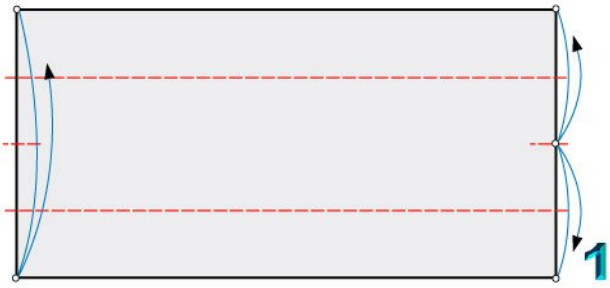
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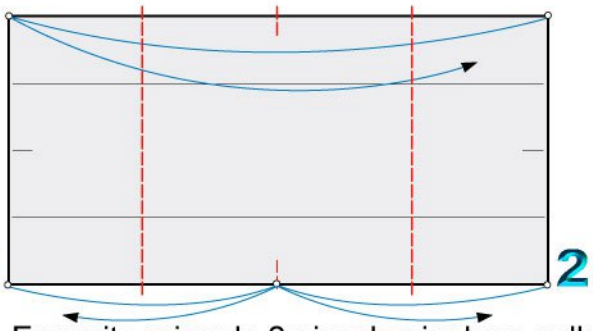
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A- BLOCCO BASE

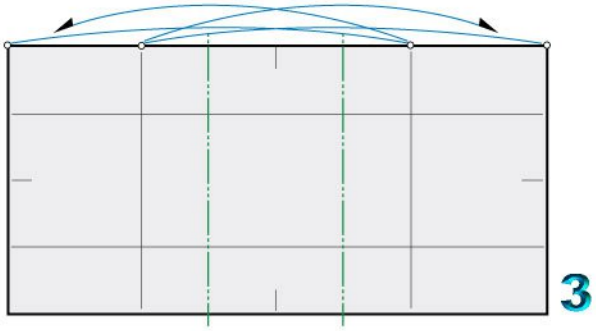
Principale elemento base di tutte le costruzioni, di semplice realizzazione. Dividete a metà il foglio quadrato comune per tutte le costruzioni, di carta pesante o cartoncino monocolore. L' edificio risulterà più realistico se si adoperano più tonalità di colore, naturalmente di tono similare.



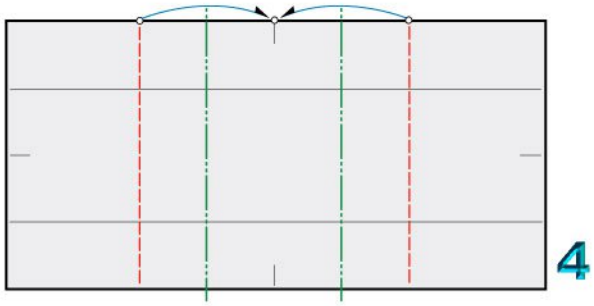
Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 longitudinali



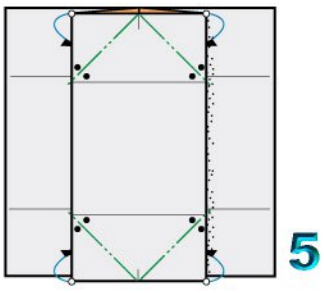
Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 trasversali



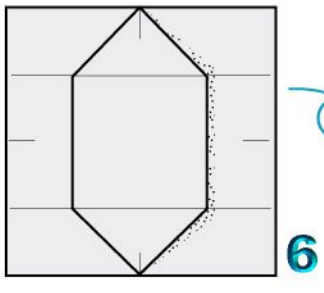
2 pieghe verticali a monte



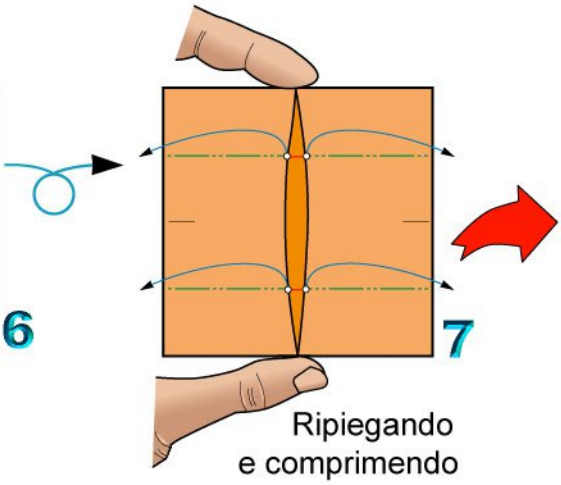
Ruotate ripiegando a valle ed a monte



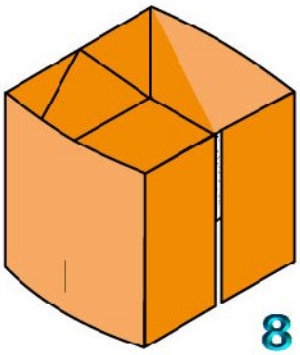
4 pieghe bisettrici a monte e ruotate all'interno



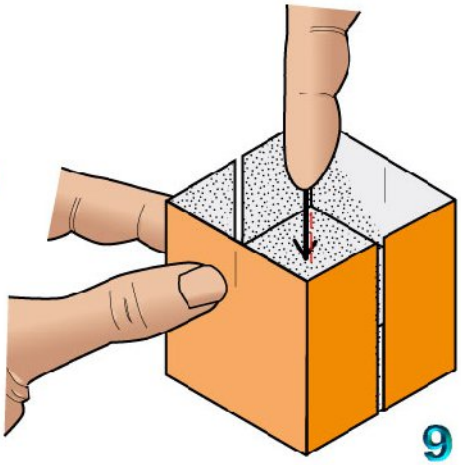
Ribaltate



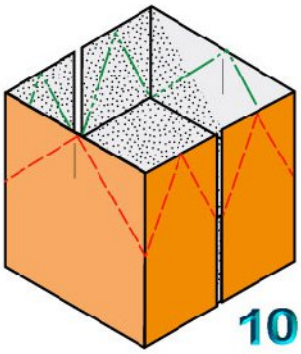
Ripiegando e comprimendo contemporaneamente, aprite modellando 3D



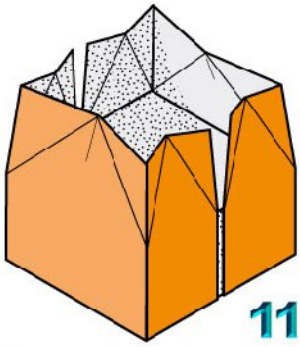
Ribaltate



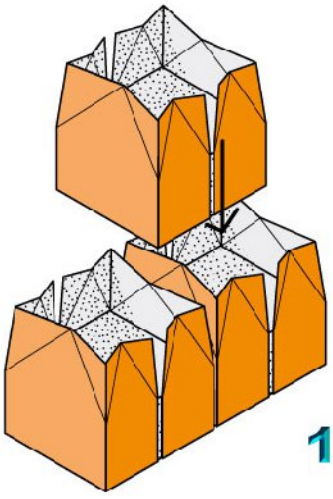
Comprimete gli spigoli e fate rientrare leggermente il fondo

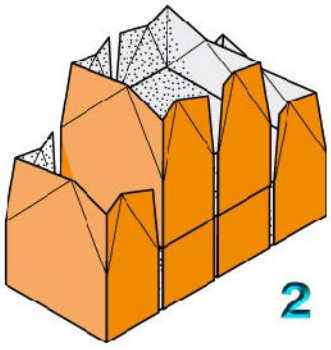


Con una serie di pieghe a valle restringete il perimetro delbordo superiore



Blocco base A ultimato

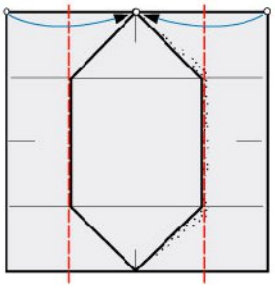




ESEMPIO DI UNIONE DI 3 BLOCCHI “A”

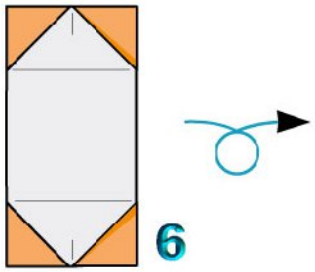
A1- BLOCCO PIATTO

Questo modulo serve per rifinire un muro o come davanzale di una finestra.
In quest'ultimo caso, usate carta bicolore, per simulare il colore del marmo.



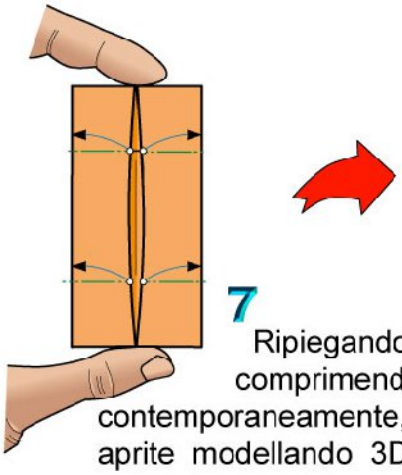
5

Partite dalla fig. n. 4 del blocco A.
2 pieghe a valle e ruotate intascando



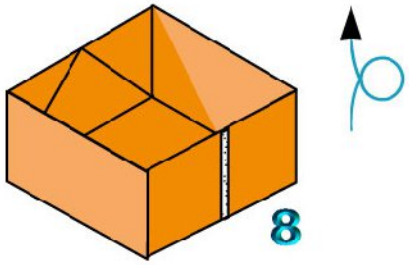
6

Ribaltate



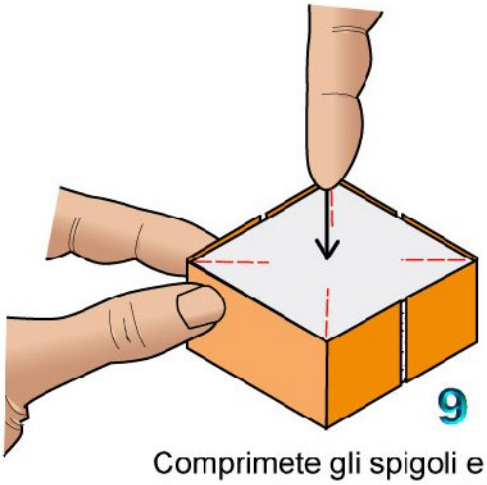
7

Ripiegando e comprimendo contemporaneamente, aprite modellando 3D



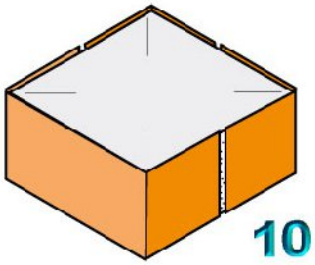
8

Ribaltate



9

Comprimete gli spigoli e fate rientrare leggermente il fondo

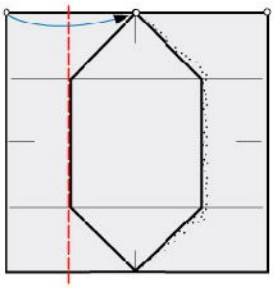


10

Blocco base A1 ultimato

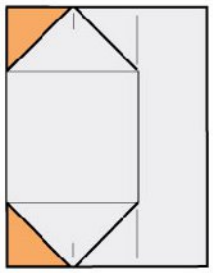
A_2- BLOCCO SEMIPIATTO

Semplice blocco dai molteplici usi



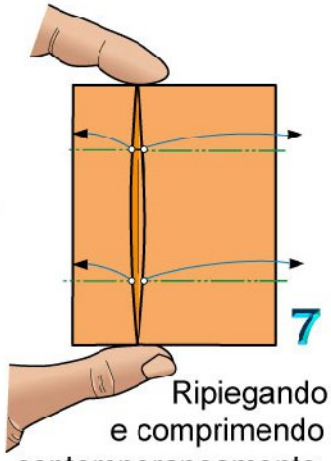
5

Partite dalla fig. n. 4 del blocco A.
1 piega a valle e ruotate intascando



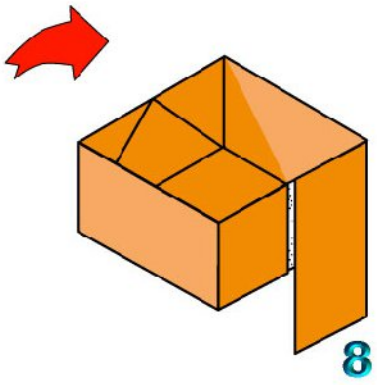
6

Ribaltate



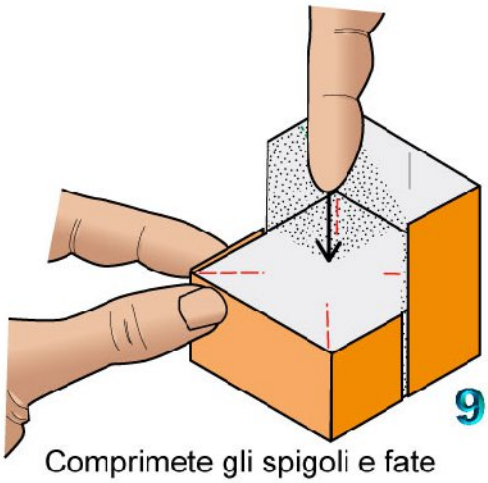
7

Ripiegando
e comprimendo
contemporaneamente,
aprite modellando 3D



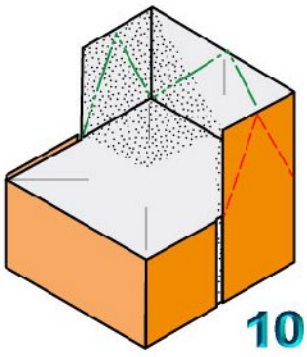
8

Ribaltate



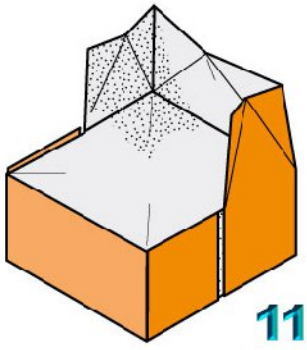
9

Comprimete gli spigoli e fate
rientrare leggermente il fondo



10

Con una serie di pieghe a valle restringete
il perimetro del bordo superiore

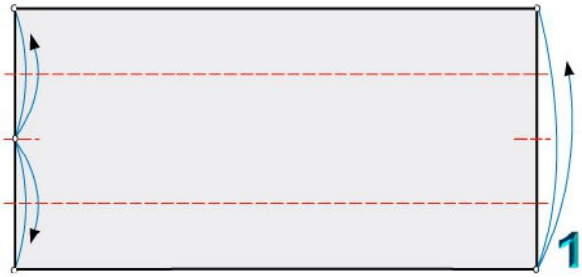


11

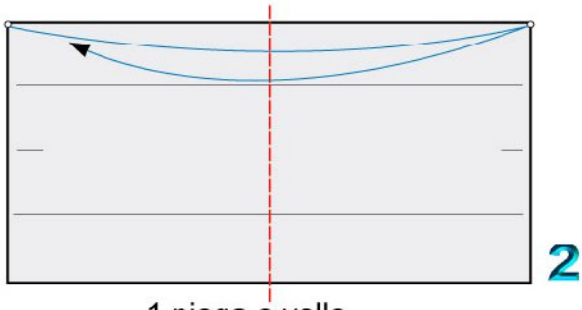
Blocco A2 ultimato

A_3-BLOCCO D'ANGOLO

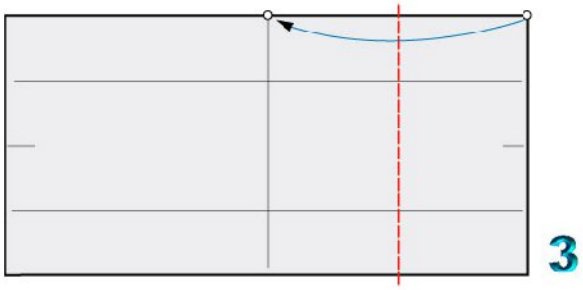
Questo modulo serve principalmente per eseguire angoli di muro a 90°.
Si realizza unendo 2 moduli uguali, costruiti partendo dal solito foglio rettangolare.



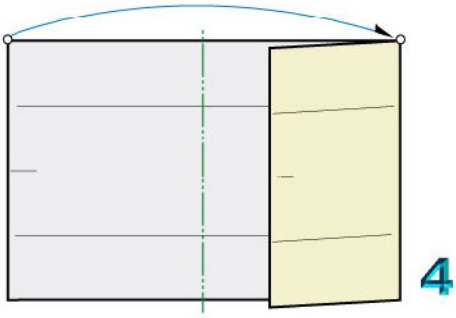
Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 longitudinali



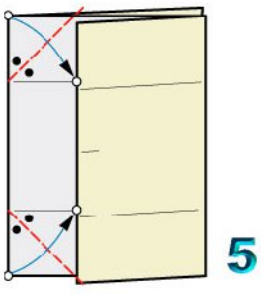
1 piega a valle



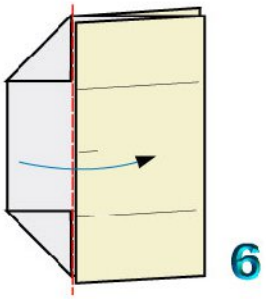
1 piega a valle e ruotate



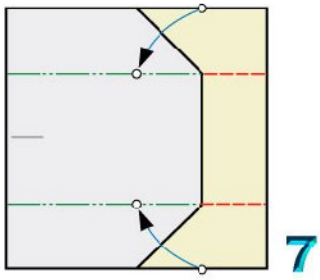
1 piega a monte e ruotate



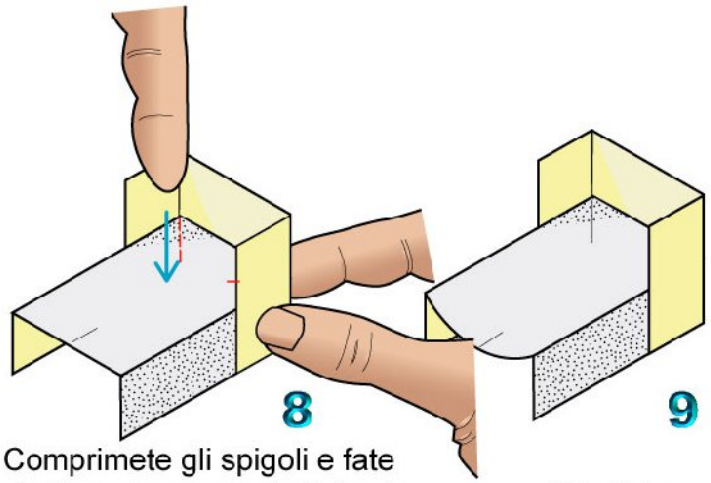
2 pieghe bisettrici a valle e ruotate



1 piega a valle solo sulla sup. in vista e ruotate



ripiegando a valle ed a monte ruotate modellando 3D

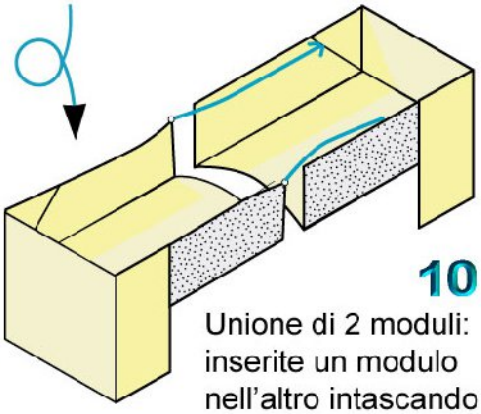


8

Comprimete gli spigoli e fate rientrare leggermente il fondo

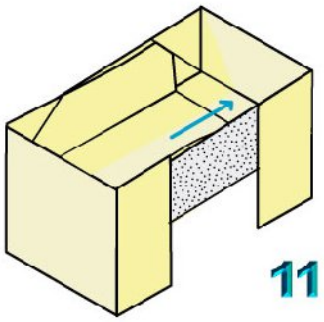
9

Ribaltate



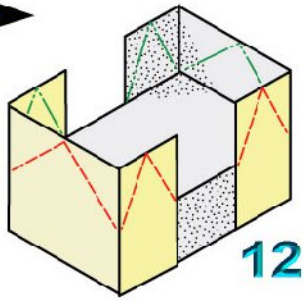
10

Unione di 2 moduli: inserite un modulo nell'altro intascando i vertici indicati



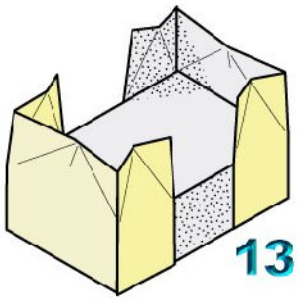
11

Ribaltate



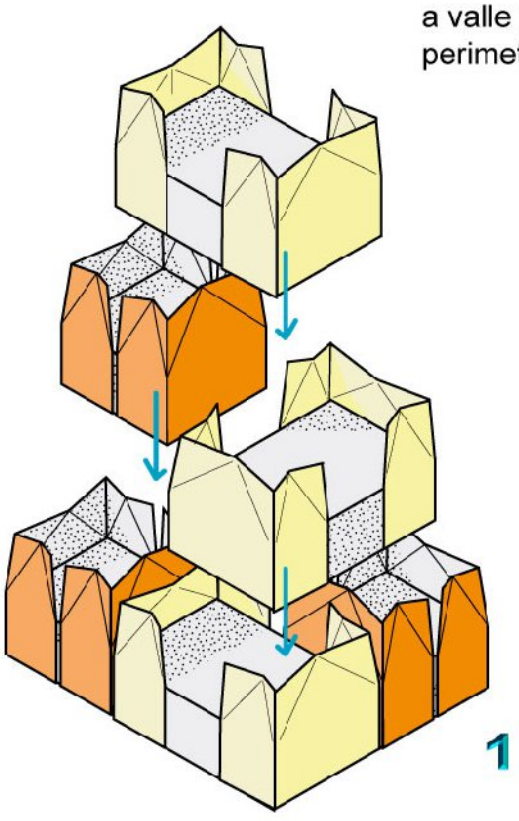
12

Con una serie di pieghe a valle restringete il perimetro del bordo superiore

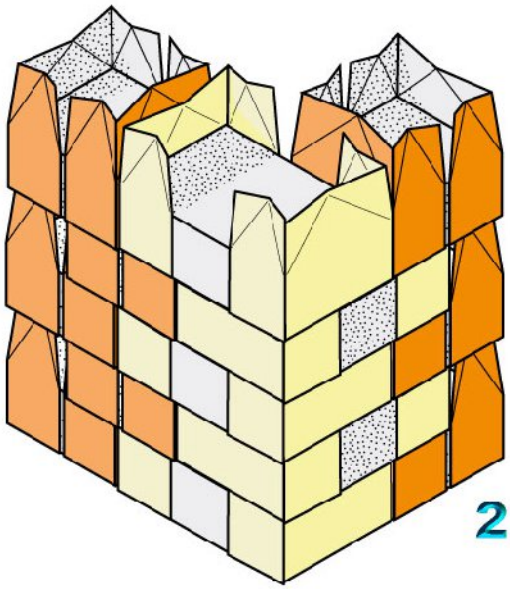


13

Blocco A3 ultimato



1

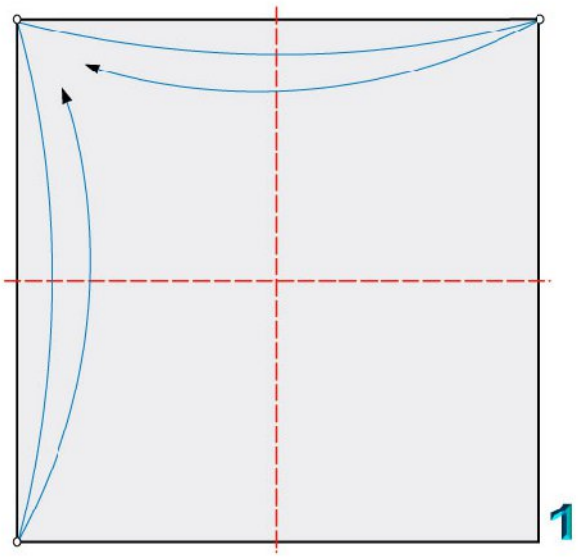


2

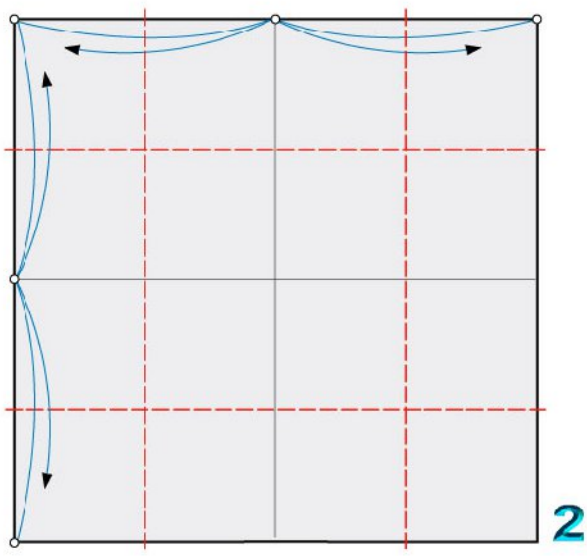
ESEMPIO DI UNIONE FRA BLOCCHI "A" ED "A3" PER FORMARE UN MURO AD ANGOLO

A4-BLOCCO SPECIALE

Questo è un modulo elaborato che può avere diverse applicazioni; ad esempio è di base per le merlature d'angolo.



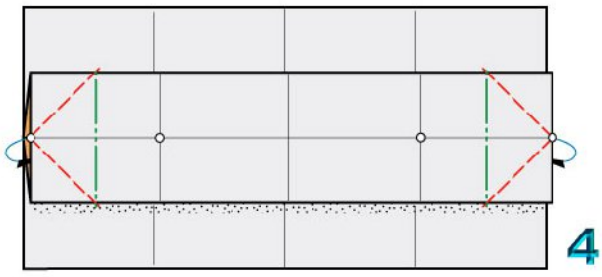
2 pieghe a valle



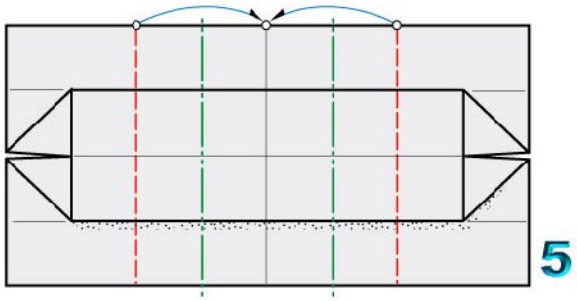
4 pieghe a valle



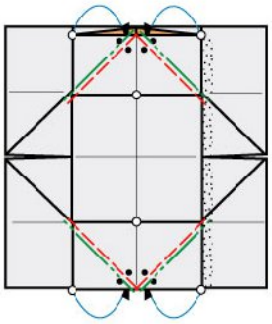
2 pieghe a monte e ruotate ripiegando a valle



2 pieghe rovesce interne

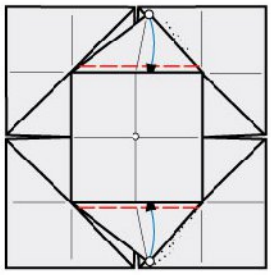


2 pieghe a monte e ruotate ripiegando a valle



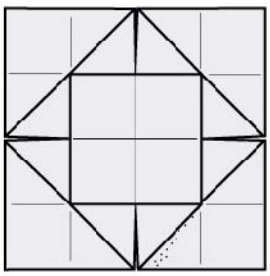
6

4 pieghe rovesce interne



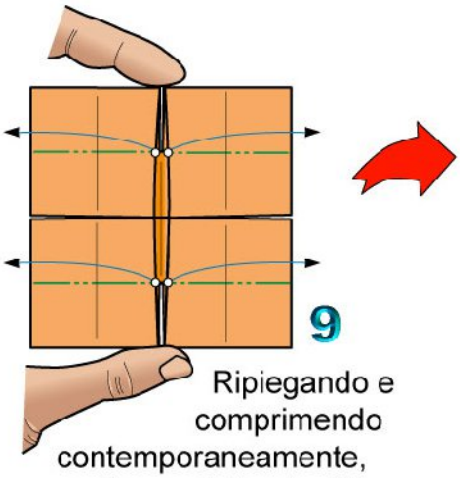
7

2 pieghe a valle
ed intascate



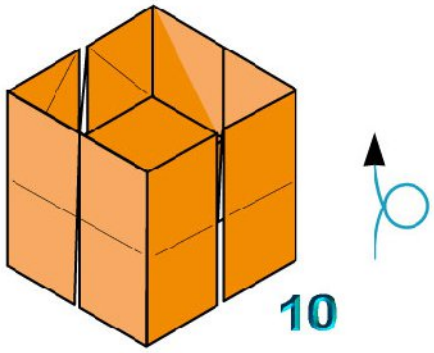
8

Ribaltate



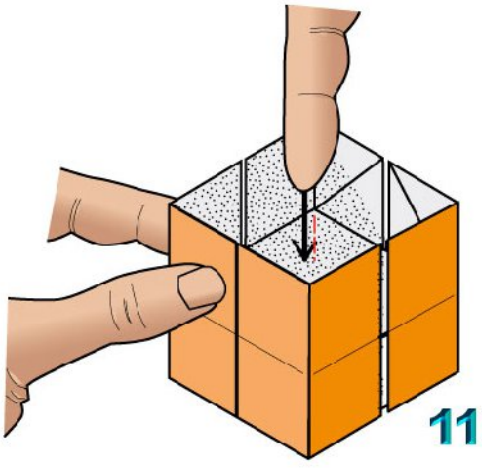
9

Ripiegando e
comprimendo
contemporaneamente,
aprite modellando 3D



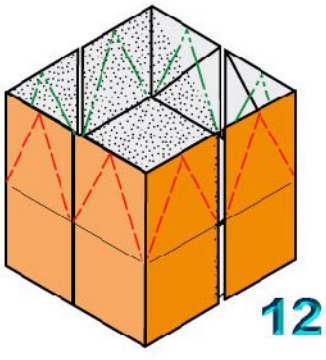
10

Ribaltate



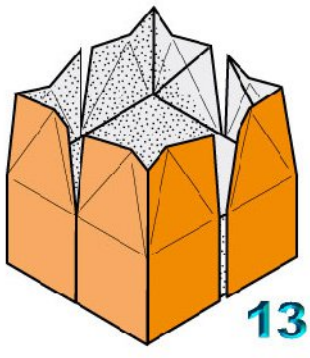
11

Comprimendo gli spigoli fate
rientrare leggermente il fondo



12

Con una serie di pieghe a
valle restringete il perimetro
del bordo superiore



13

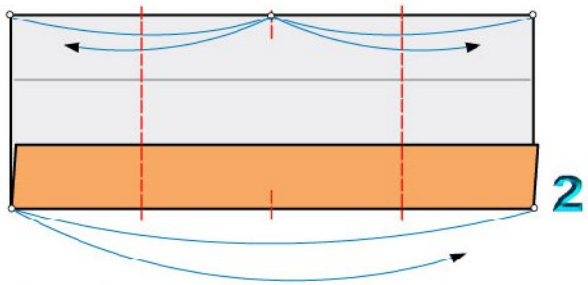
Blocco A4 ultimato

B - SEMIBLOCCO

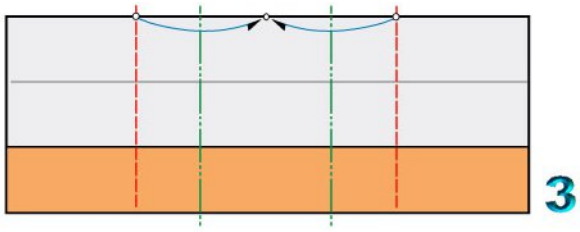
Questo modulo serve principalmente per eseguire muri di testa o pareti divisorie di minor spessore come ad esempio parapetti di muro di cinta. Dopo aver ridotto la larghezza del rettangolo iniziale, la costruzione è uguale a quella del blocco A.



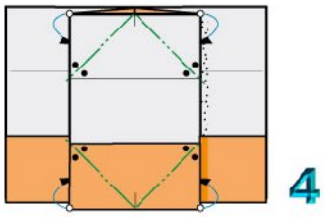
3 pieghe a valle e ruotate il bordo inferiore



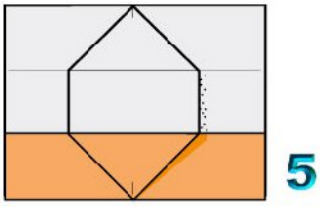
Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 trasversali



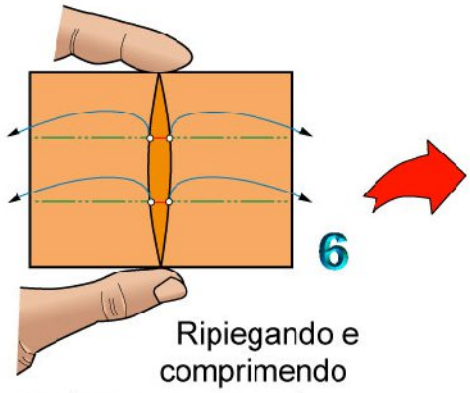
2 pieghe a monte e ruotate ripiegando a valle



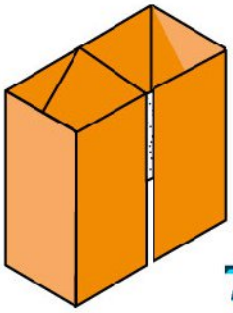
4 pieghe a monte e ruotate all'interno



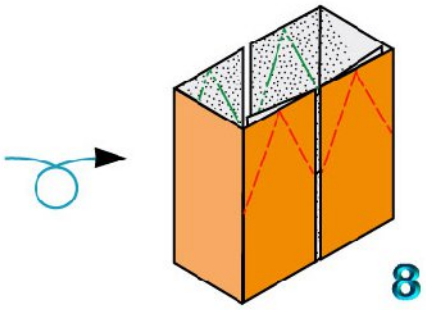
Ribaltate



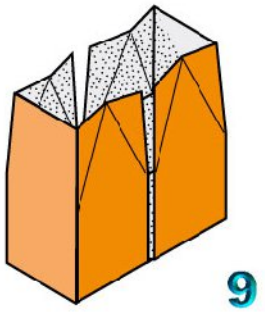
Ripiegando e comprimendo contemporaneamente, aprite modellando 3D



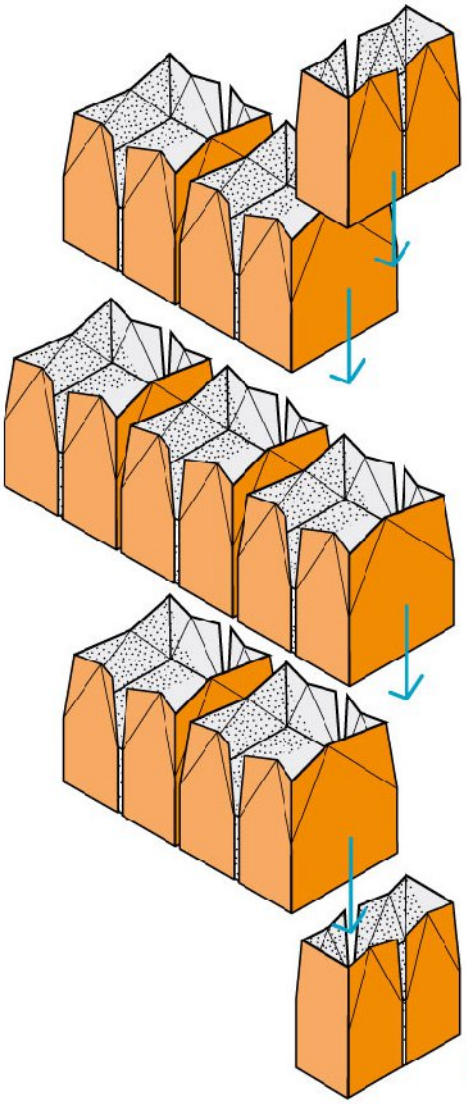
Ribaltate

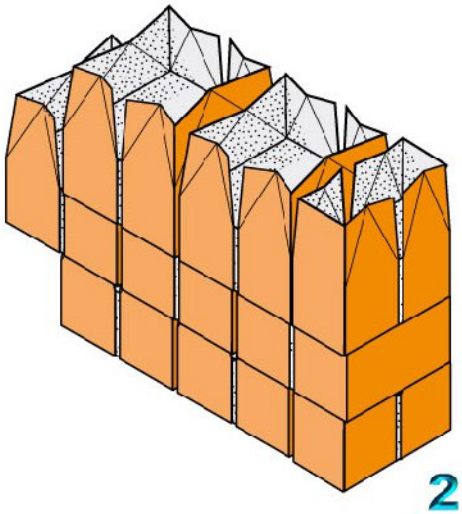


Con una serie di pieghe a valle restringete il perimetro del bordo superiore



Mezzo blocco B ultimato

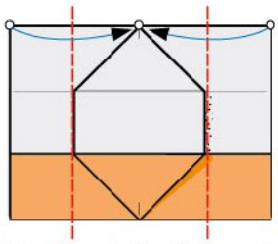




ESEMPIO DI MURO DI TESTA FORMATO DA BLOCCHI BASE “A” E MEZZI BLOCCHI “B”

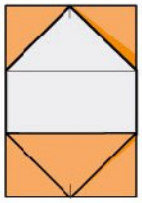
B1-SEMIBLOCCO PIATTO

Questo modulo serve principalmente per completare un muro



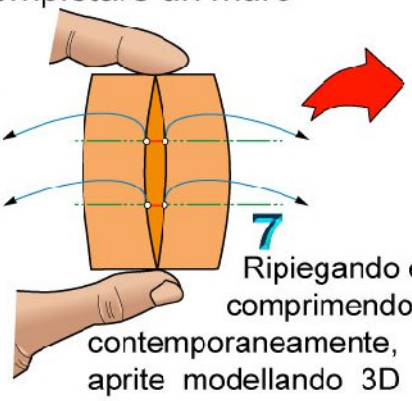
5

Partite dalla fig. n. 4 del semiblocco B.
2 pieghe a valle e ruotate intascando



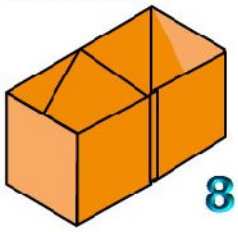
6

Ribaltate



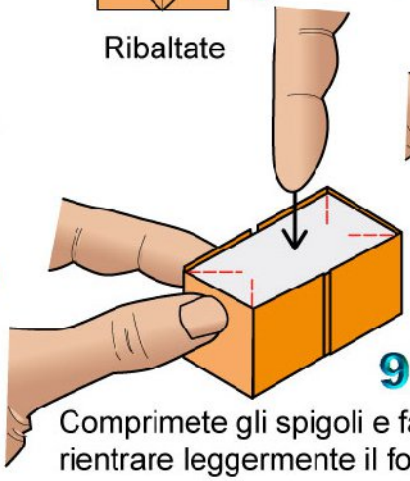
7

Ripiegando e comprimendo contemporaneamente, aprite modellando 3D



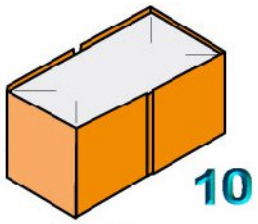
8

Ribaltate



9

Comprimete gli spigoli e fate rientrare leggermente il fondo

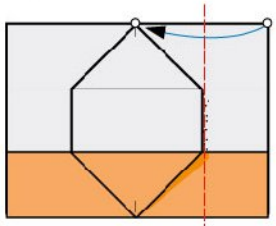


10

Semiblocco B1 ultimato

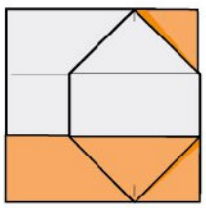
B2-SEMIBLOCCO SEMIPIATTO

Modulo che può avere diverse applicazioni; ad esempio si usa nella costruzione del campanile.



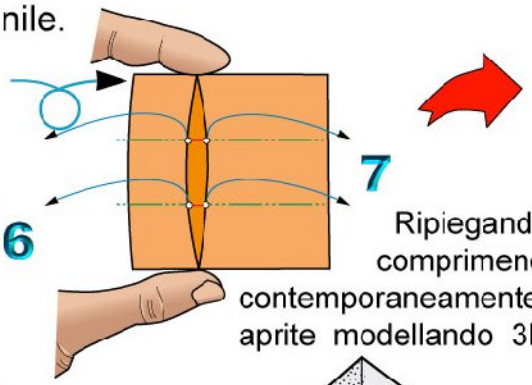
5

Partite dalla fig. n. 4 del semiblocco B.
1 piega a valle e ruotate intascando



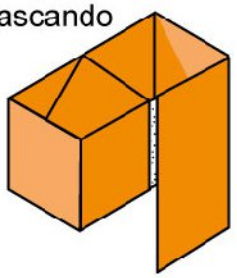
6

Ribaltate



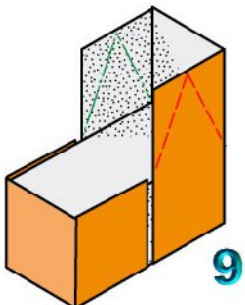
7

Ripiegando e comprimendo contemporaneamente, aprite modellando 3D



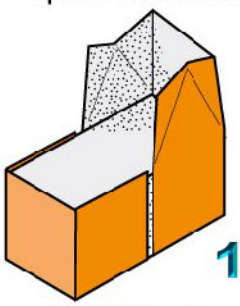
8

Ribaltate



9

Con una serie di pieghe a valle restringete il bordo superiore



10

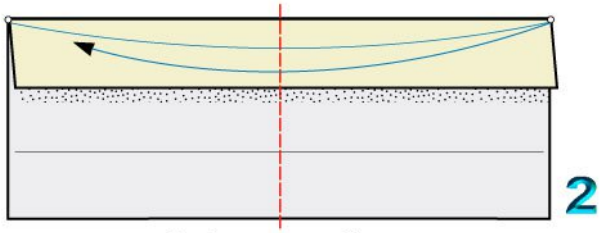
Semiblocco B2 ultimato

B_3- SEMIBLOCCO D'ANGOLO

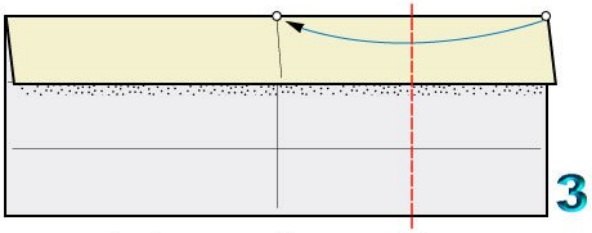
Questo modulo serve per eseguire angoli di muro a 90°e muri di testa.
Si realizza unendo 2 moduli uguali.
Dopo aver ridotto la larghezza del rettangolo iniziale, la costruzione è uguale a quella del blocco A3.



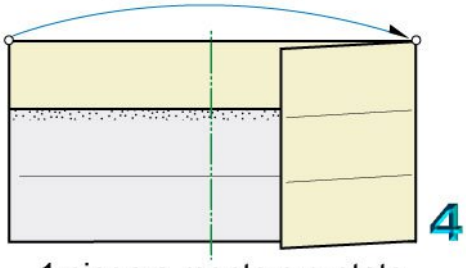
3 pieghe a valle e ruotate il bordo superiore



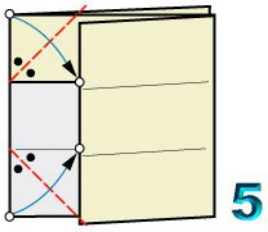
1 piega a valle



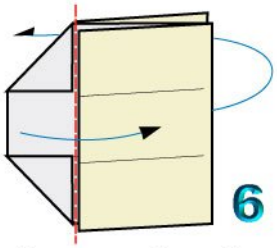
1 piega a valle e ruotate



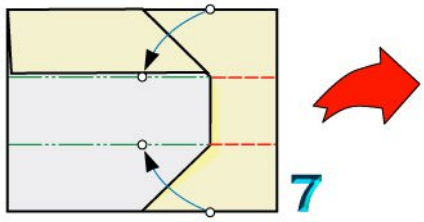
1 piega a monte e ruotate



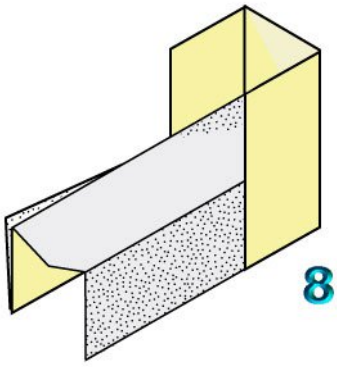
2 pieghe bisettrici a valle e ruotate



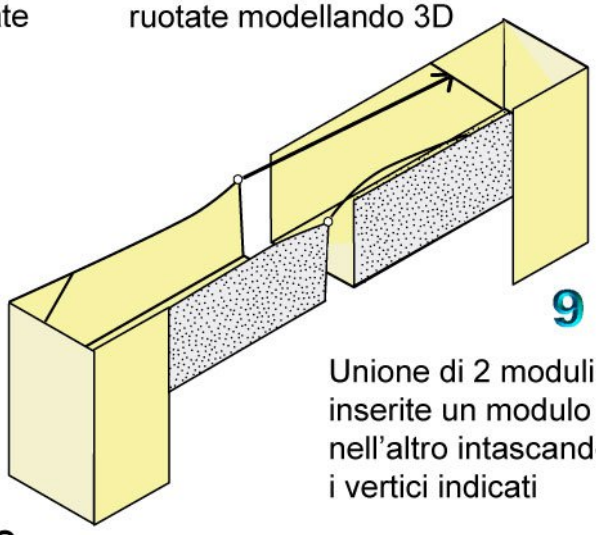
1 piega a valle solo sulla sup. in vista e ruotate



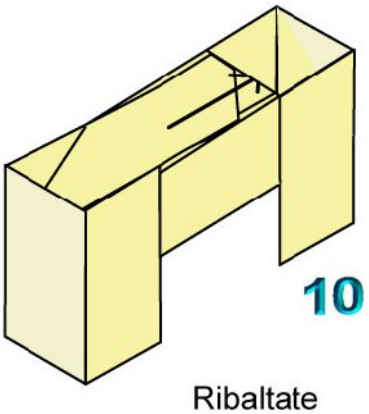
ripiegando a valle ed a monte ruotate modellando 3D



modulo ultimato; ribaltate



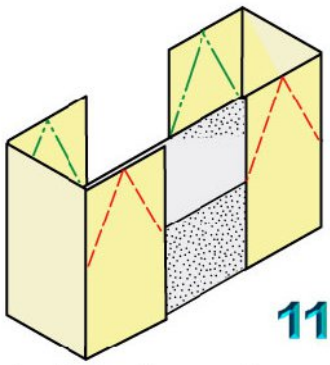
Unione di 2 moduli: inserite un modulo nell'altro intascando i vertici indicati



10

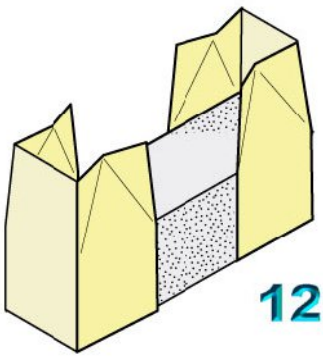
Ribaltate





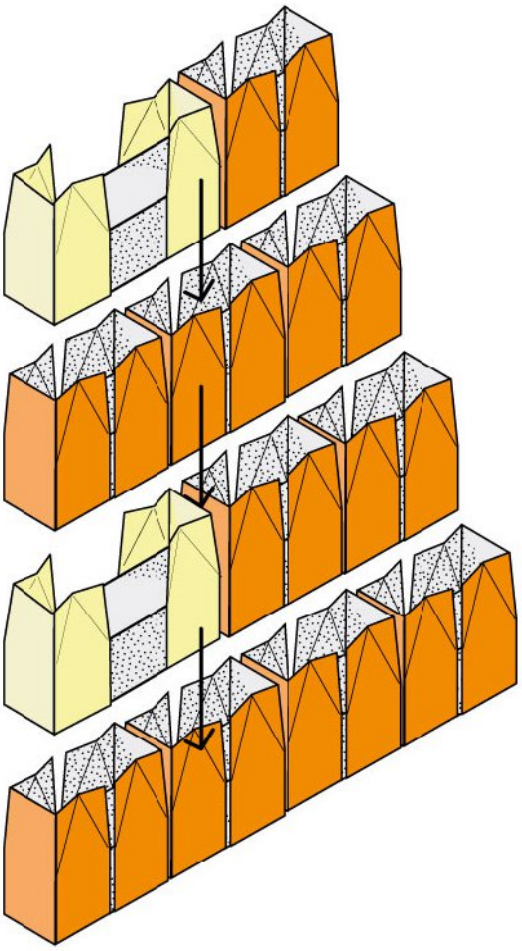
11

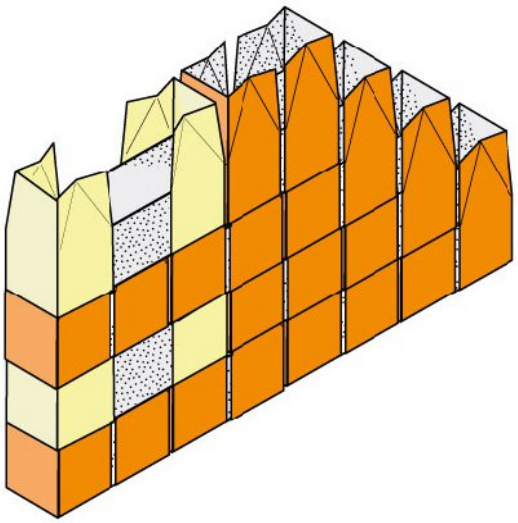
Con una serie di pieghe a valle restringete il perimetro dei bordi superiori



12

Mezzo blocco B3 ultimato

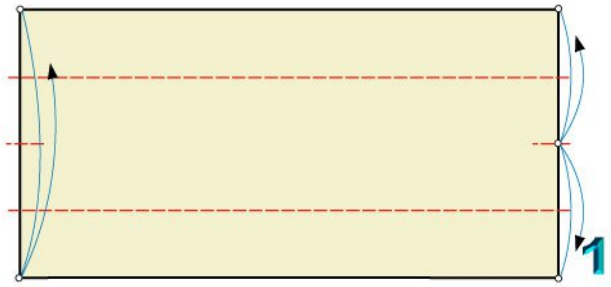




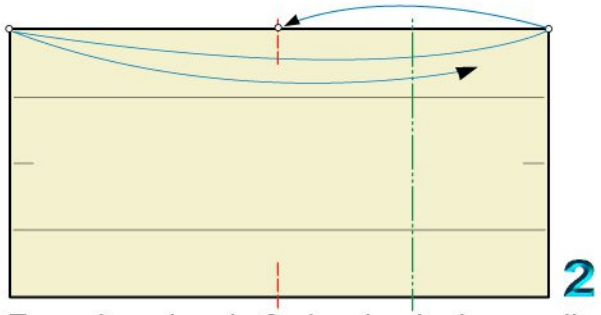
ESEMPIO DI MURO DI TESTA FORMATO DA MEZZI BLOCCHI “B” E “B3”

ARCHITRAVE

Elemento architettonico indispensabile per la realizzazione di grandi aperture (fornici) o colonnati.



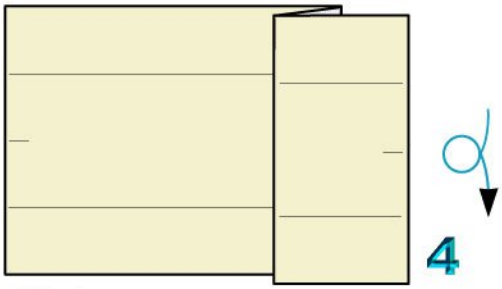
Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 longitudinali



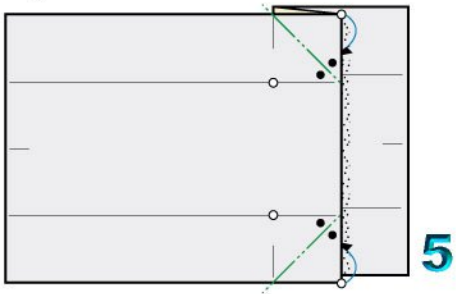
Eseguite prima le 2 piccole pieghe a valle centrali e poi una a monte verticale e ruotate



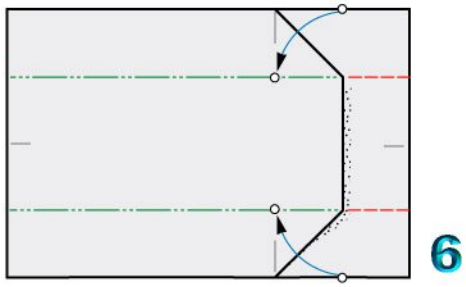
Una piega a valle solo sulla sup. in vista e ruotate



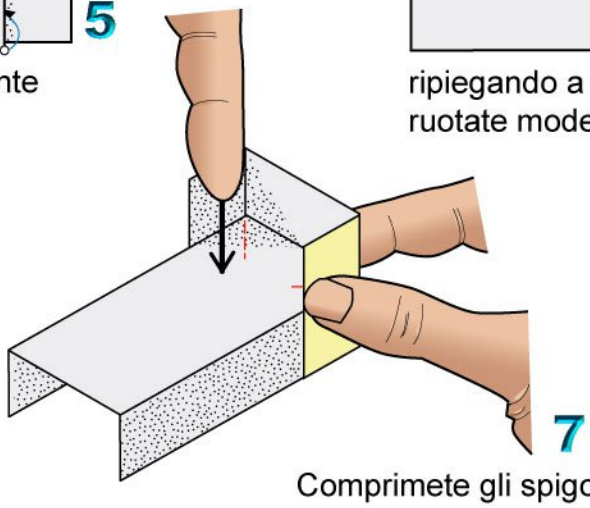
Ribaltate



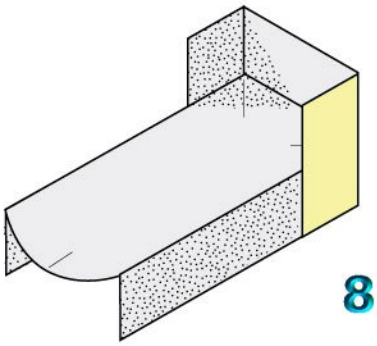
2 pieghe bisettrici a monte e ruotate all' interno



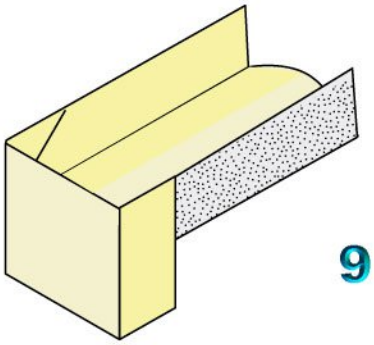
ripiegando a valle ed a monte ruotate modellando 3D



Comprimete gli spigoli e fate rientrare leggermente il fondo

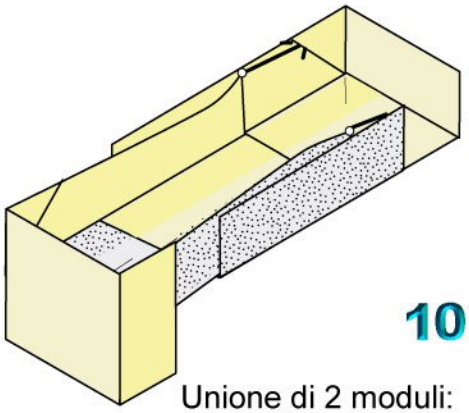


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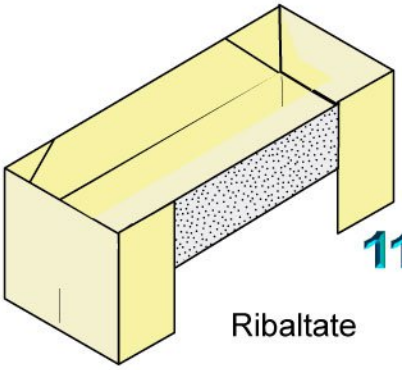
9

Modulo ultimato;
ribaltate



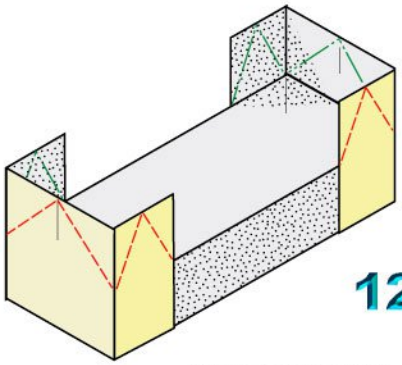
10

Unione di 2 moduli:
inserite un modulo
nell'altro intascando
i vertici indicati



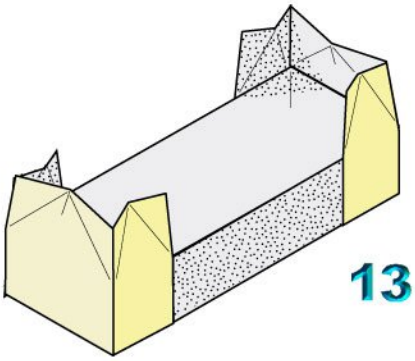
11

Ribaltate



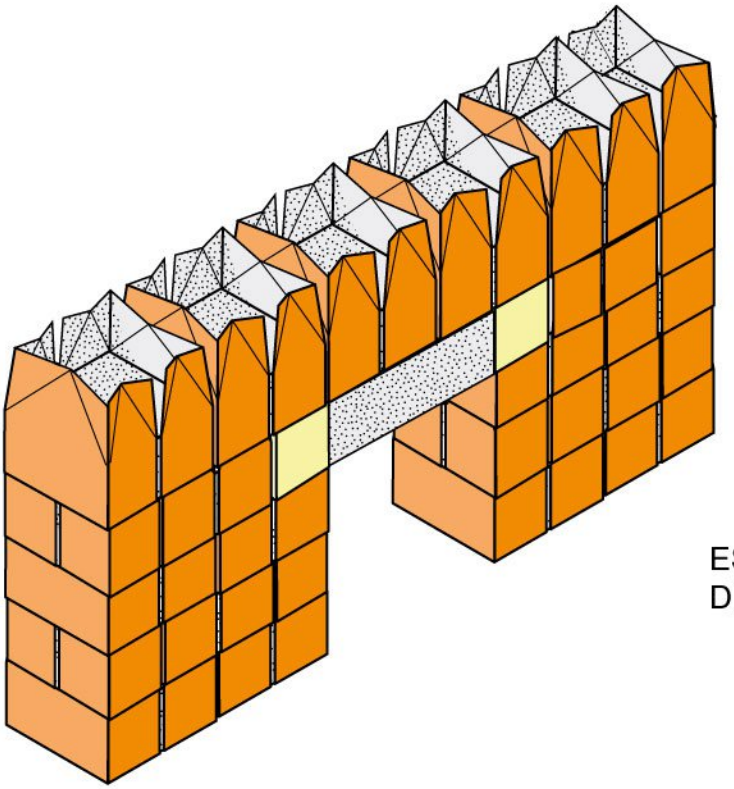
12

Con una serie di
pieghe a valle
restringete i
bordi superiori

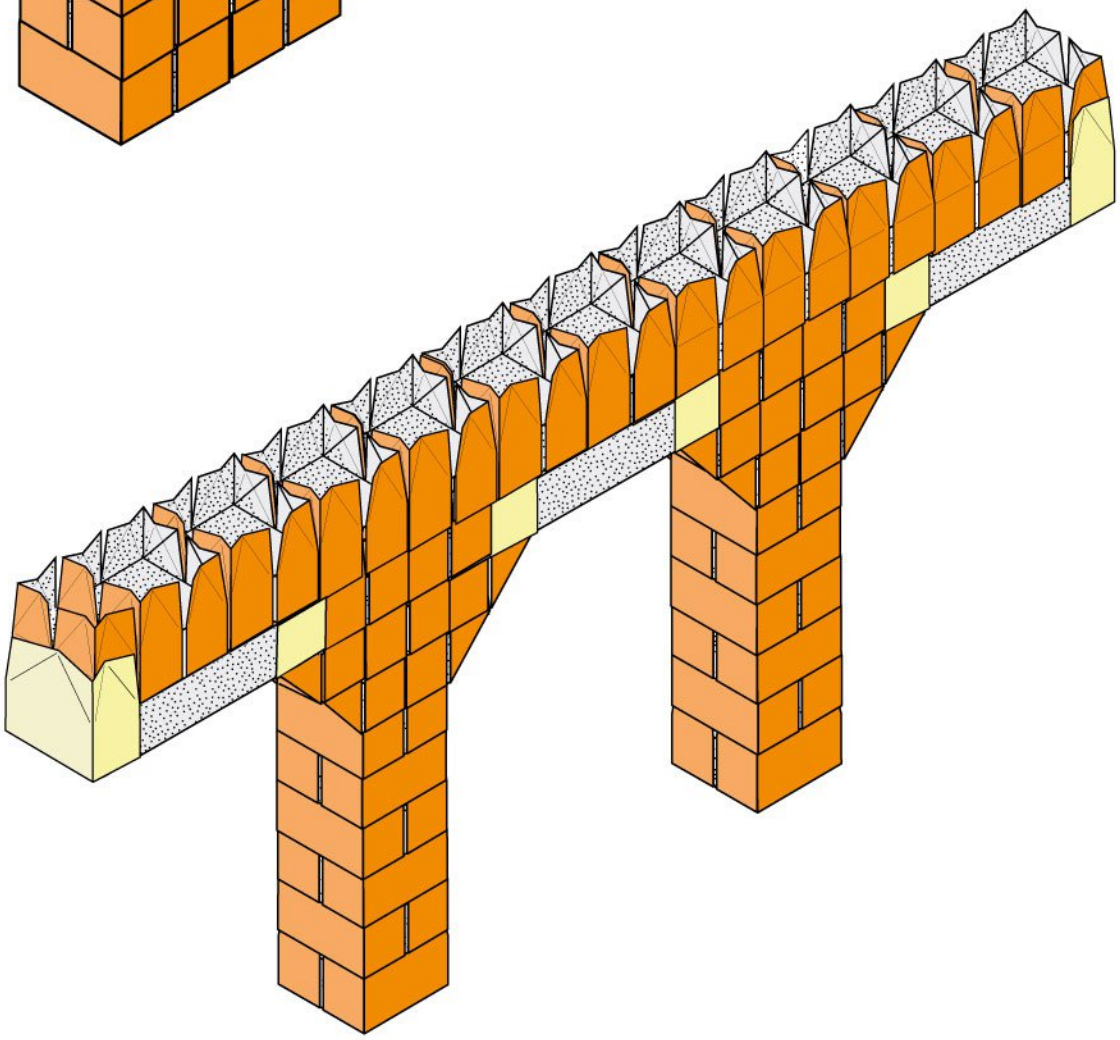


13

Architrave ultimata



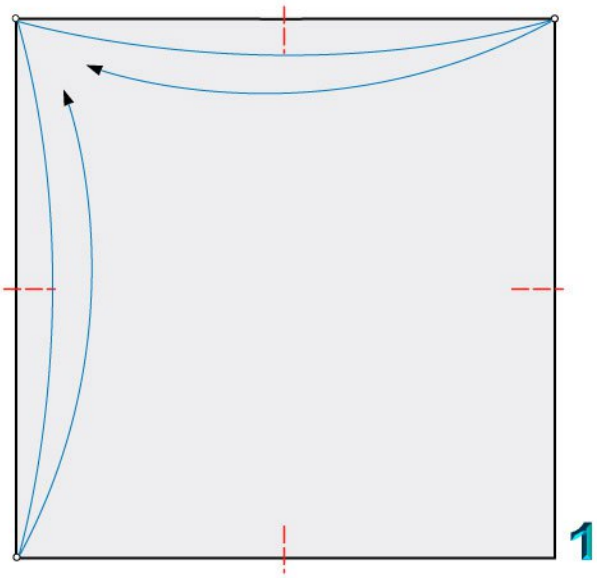
ESEMPIO DI REALIZZAZIONE
DI APERTURA ARCHITRAVATA



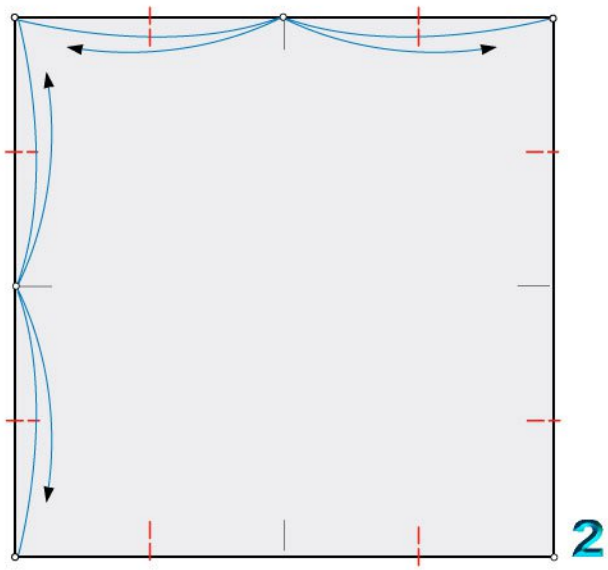
ESEMPIO DI REALIZZAZIONE DI COLONNATO A
SOSTEGNO DI CLARISTORIO DI CHIESA ROMANICA

SOLAIO

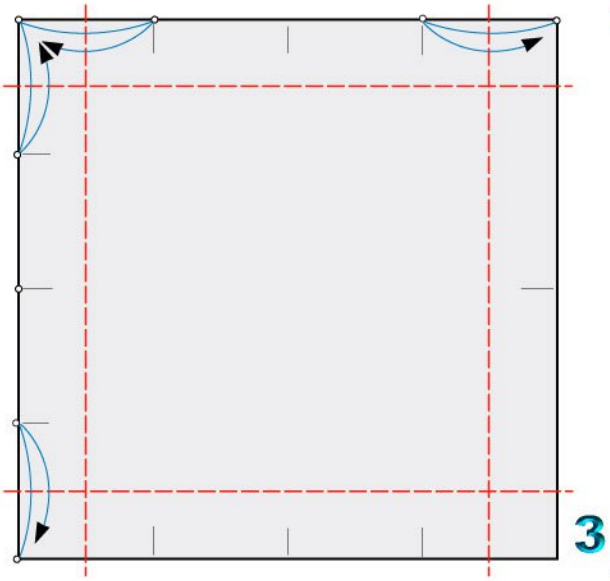
È la struttura orizzontale lignea o a volta in mattoni di un edificio medioevale, a sostegno della superficie di calpestio dei vari piani. Si realizza facilmente con un solo foglio che viene incernierato nelle pareti circostanti



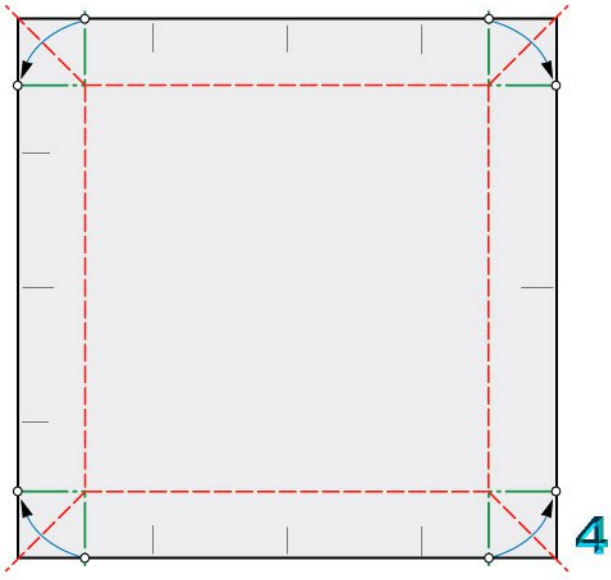
4 piccole pieghe a valle



8 piccole pieghe a valle

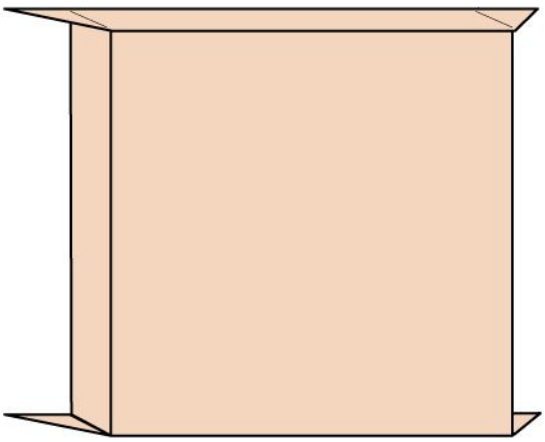


4 pieghe a valle



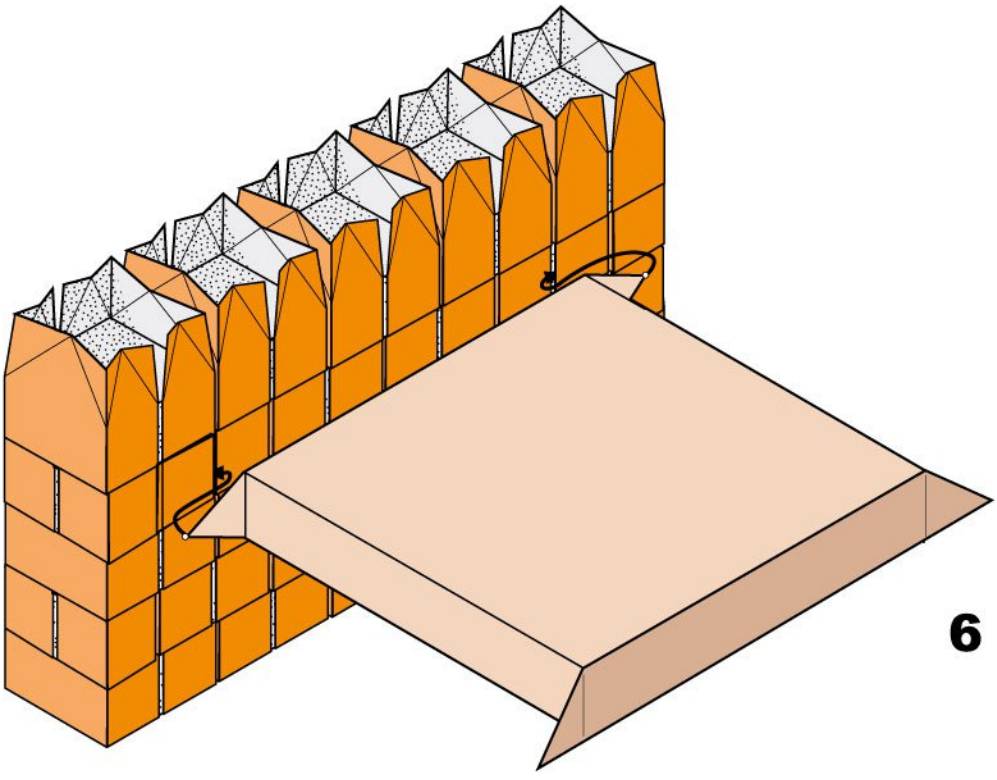
4 piccole pieghe a valle, ruotate e ribaltate





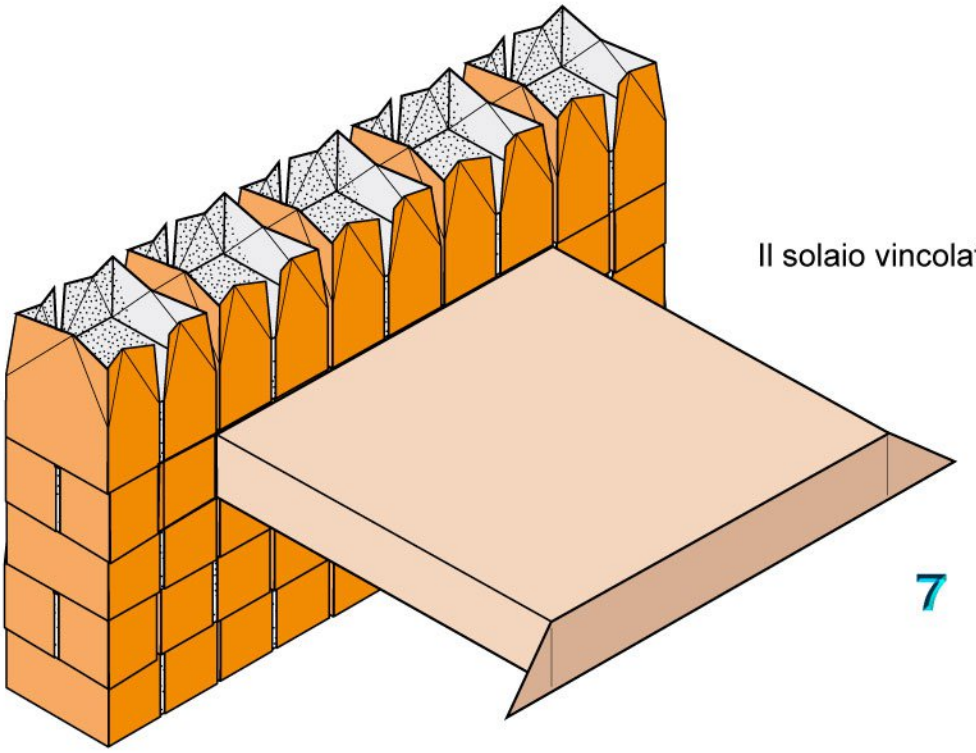
Solaio quadrato ultimato

5



6

Il solaio si vincola alle pareti inserendone i vertici
nelle fessure presenti nel centro dei blocchi base A



Il solaio vincolato

7

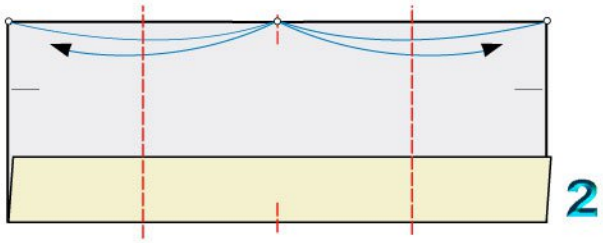
BALCONE

Si realizza piegando un solo foglio quadrato e si blocca sulla parete inserendone 2 appendici nelle fessure dei blocchi base della facciata.



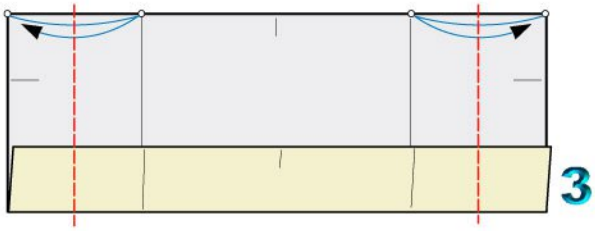
1

5 pieghe a valle, 4 piccole



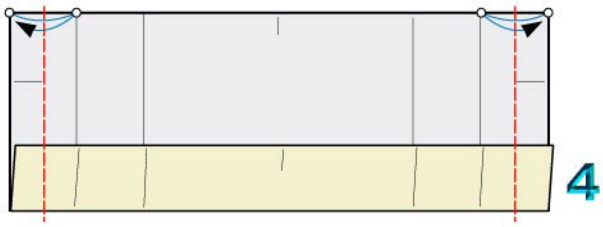
2

4 pieghe a valle, 2 piccole



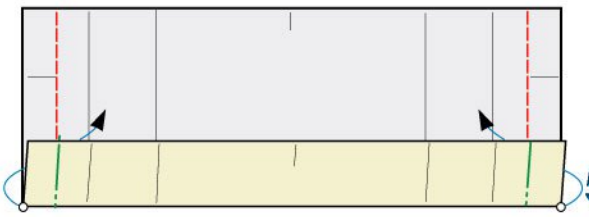
3

2 pieghe a valle

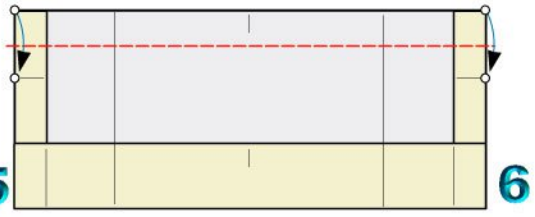


4

2 pieghe a valle



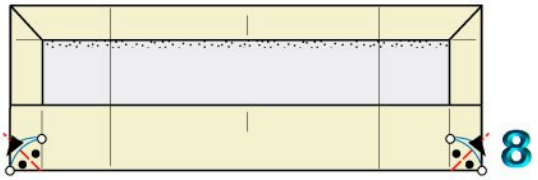
2 pieghe rovesce interne



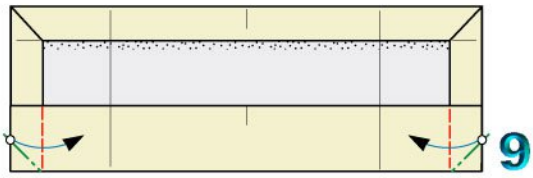
1 piega a valle e ruotate



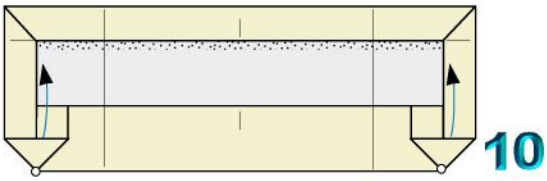
2 pieghe a monte e ruotate



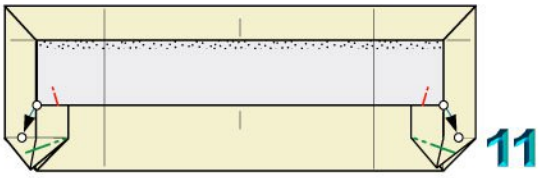
2 pieghe bisettrici a valle



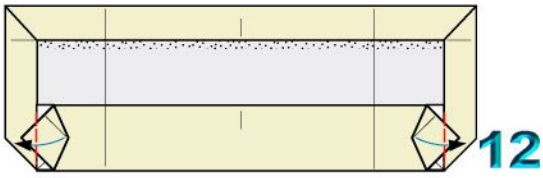
2 pieghe bisettrici a monte
e ruotate ripiegando a valle



Estraete i 2 vertici interni



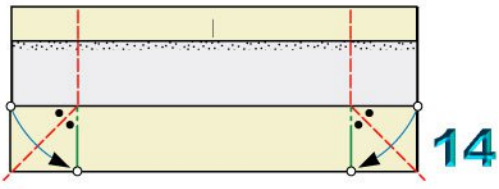
Piegando a monte ed a valle
slittate i 2 vertici indicati



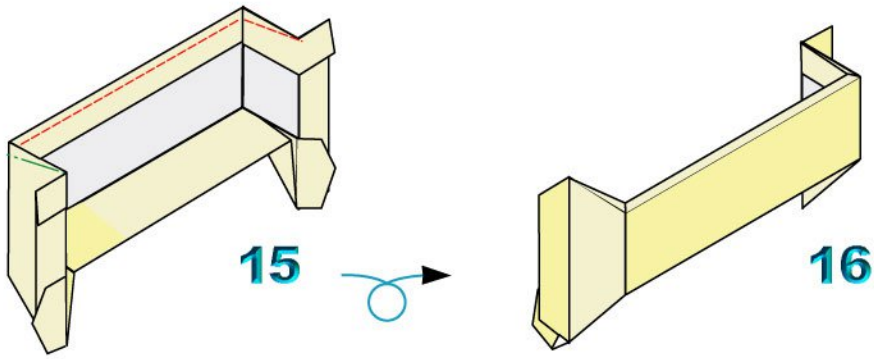
2 pieghe a valle e ruotate



Ripiegando a valle ruotate 2 volte

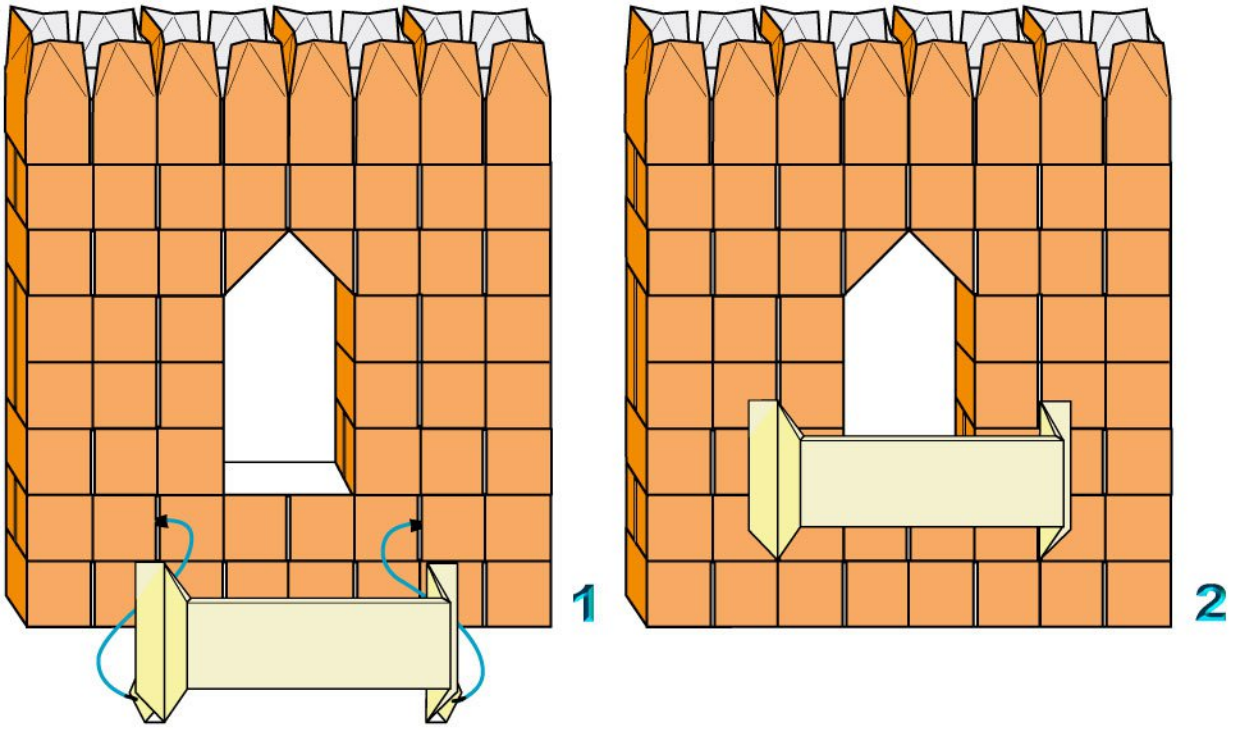


2 pieghe bisettrici a valle e,
ripiegando a monte ed a valle,
ruotate modellando 3D



Date spessore al parapetto e ribaltate

Balcone ultimato.

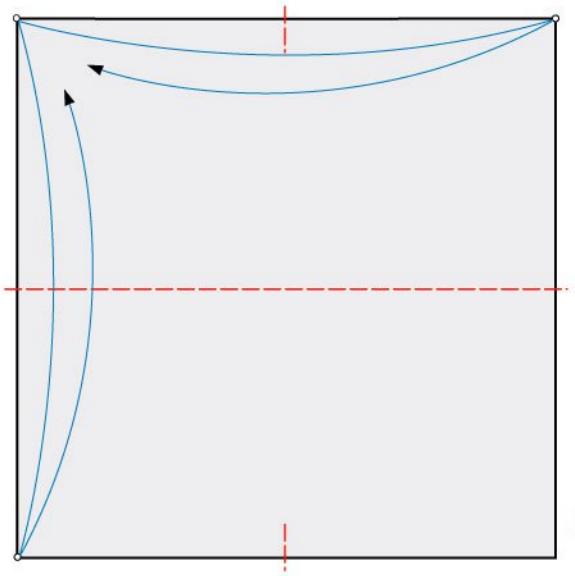


Montaggio del balcone: inserite le appendici laterali all'interno delle fessure centrali dei blocchi A

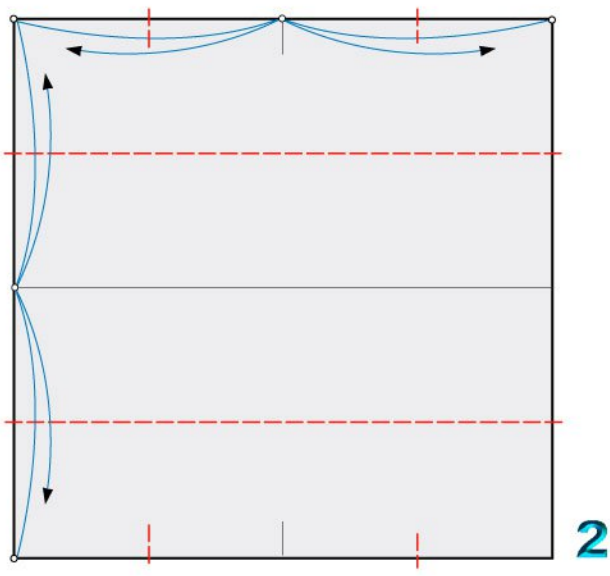
SCALE

Per realizzare le 2 rampe di scale necessarie per superare il dislivello di un piano occorrono 3 fogli quadrati dello stesso formato di quelli fin qui adoperati, 2 per le rampe di scale ed 1 per il pianerottolo.

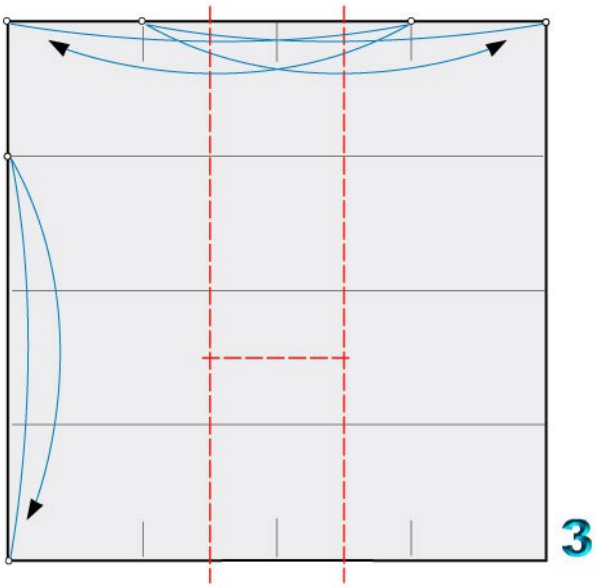
COSTRUZIONE DI UNA RAMPA SEMPLIFICATA



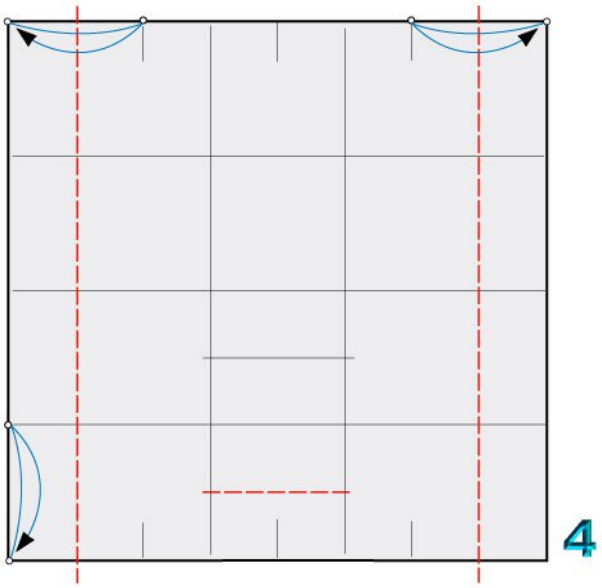
1 piega a valle e 2 più piccole



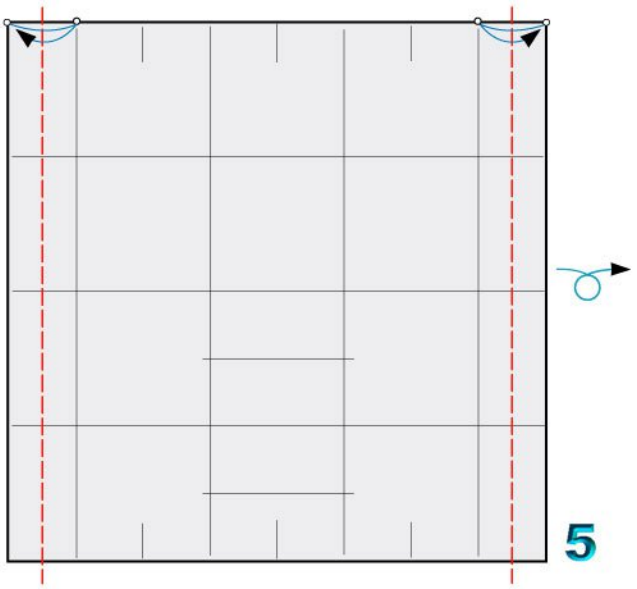
2 pieghe a valle e 4 più piccole



3 pieghe a valle

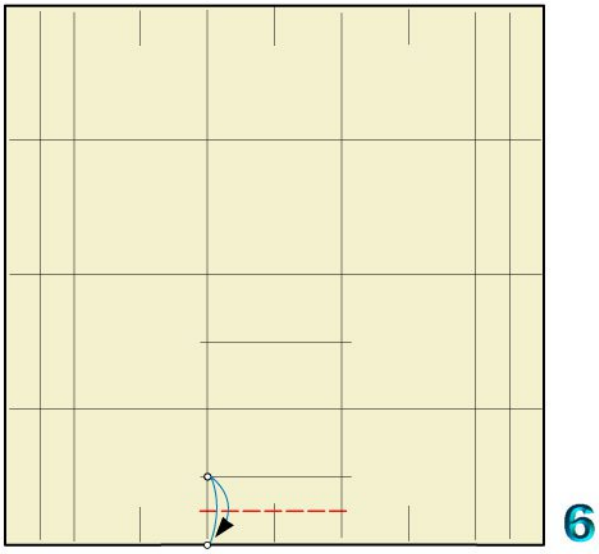


3 pieghe a valle



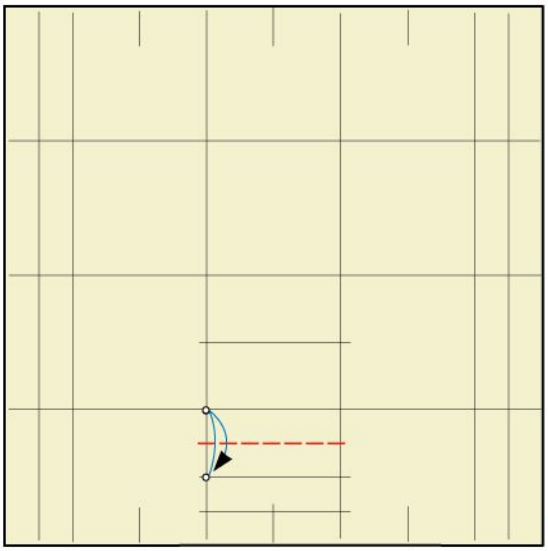
5

2 pieghe a valle



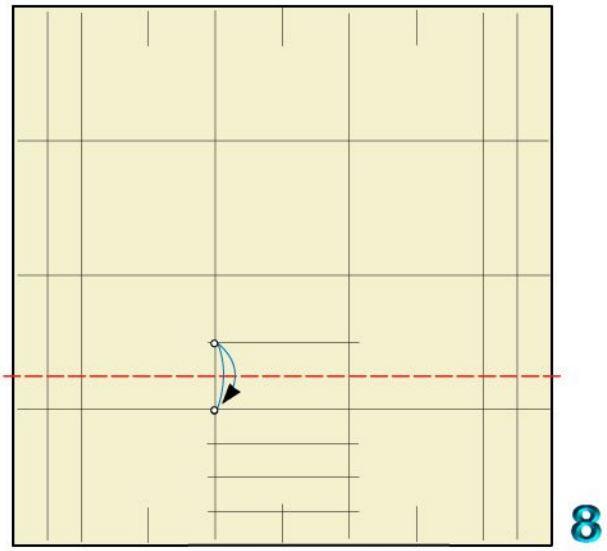
6

1 piega a valle



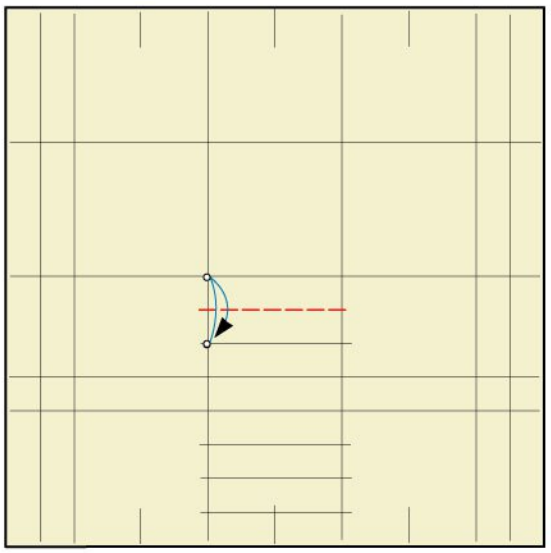
7

1 piega a valle



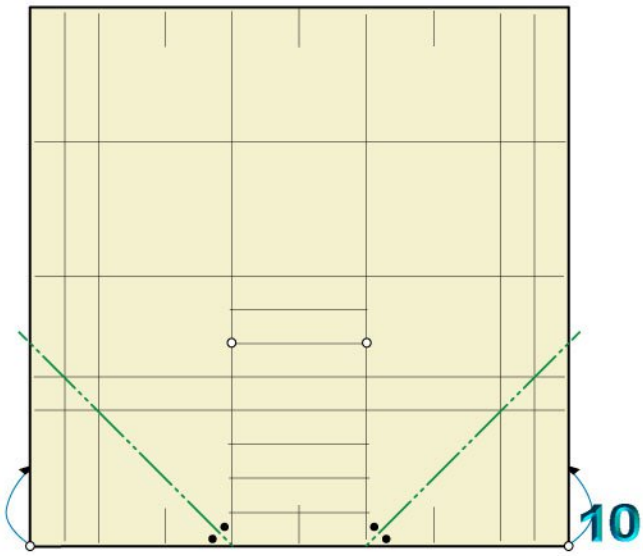
8

1 piega a valle



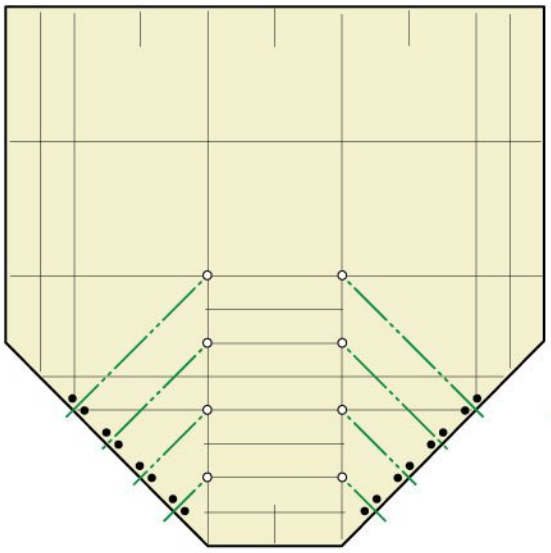
9

1 piega a valle



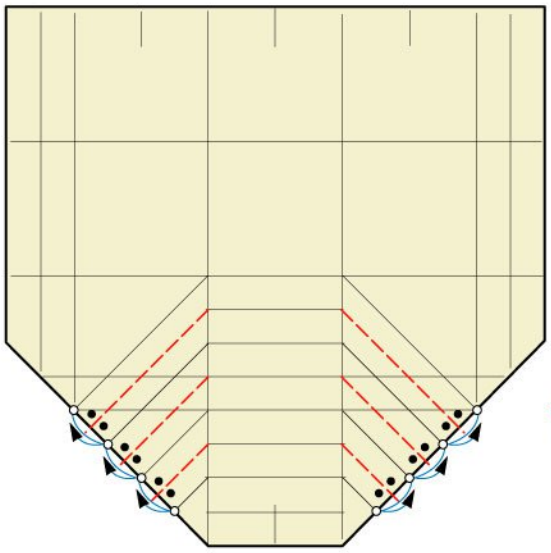
10

2 pieghe bisettrici a monte



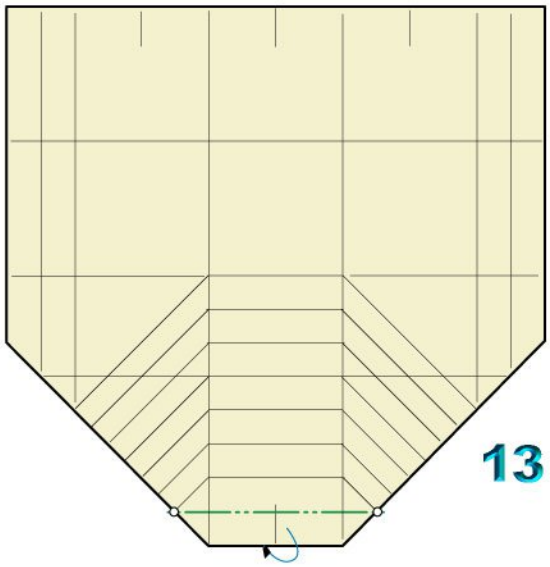
11

8 pieghe bisettrici a monte

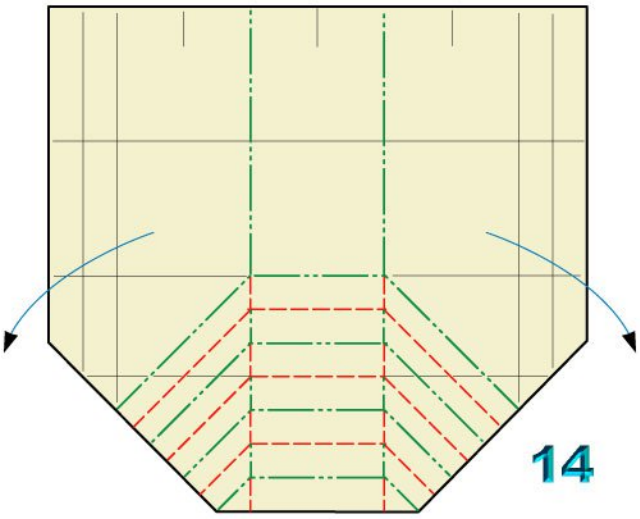


12

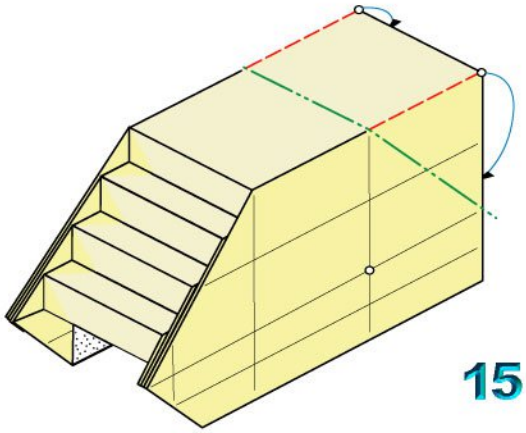
6 pieghe bisettrici a valle



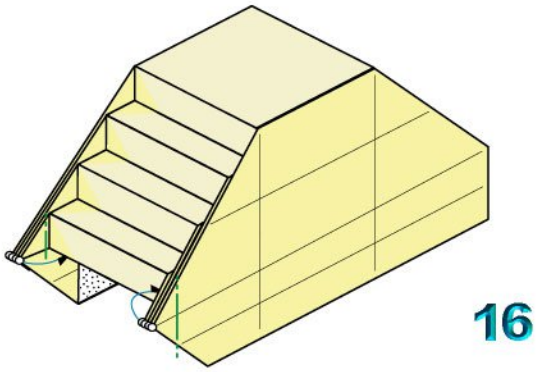
1 piega a monte



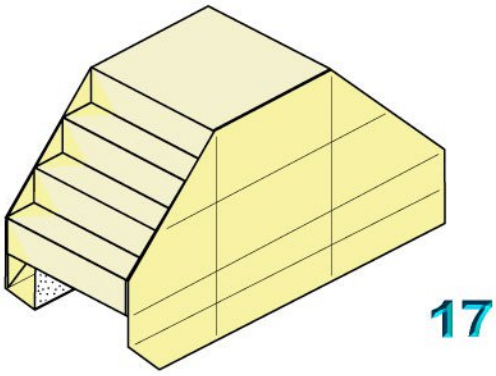
ripiegando alternativamente a valle ed a monte ruotate 3D



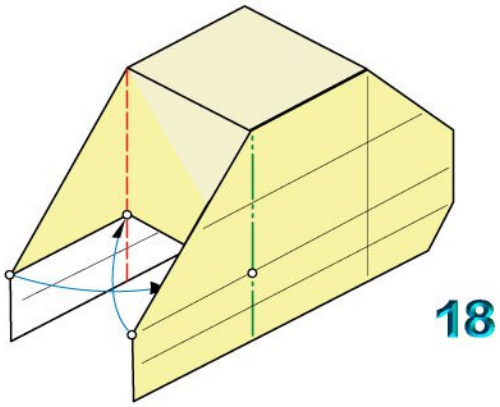
Ripiegando a valle ed a monte rovesciate il bordo indicato



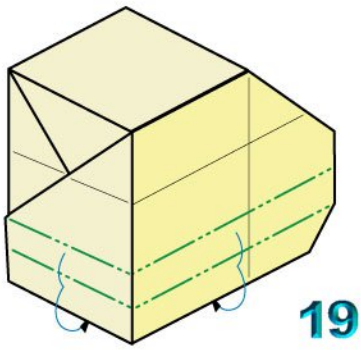
2 pieghe rovesce interne degli 8 vertici indicati



Ribaltate

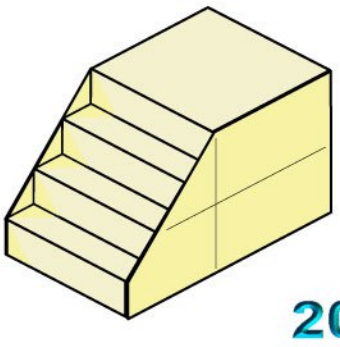


Ripiegate richiudendo le 2 appendici



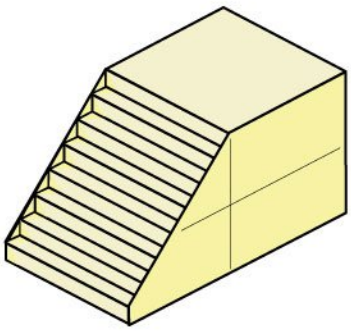
19

Ripiegate i bordi all' interno



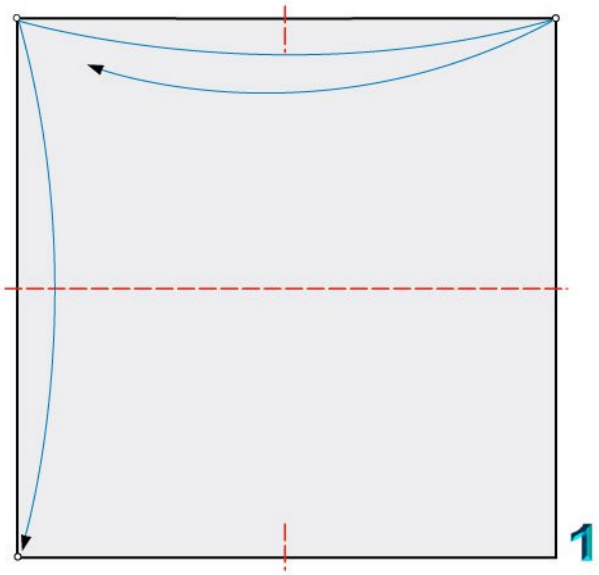
20

Rampa di scale completata semplificata



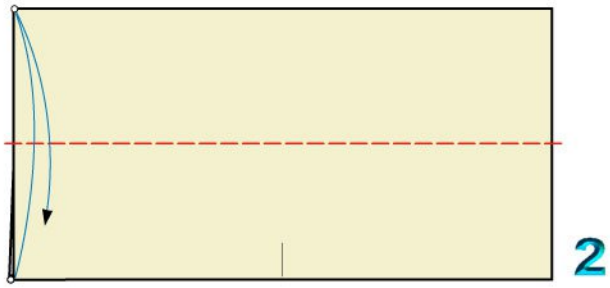
Se volete realizzare una rampa realistica dovete raddoppiare il numero di scalini

COSTRUZIONE DEL PIANEROTTOLO



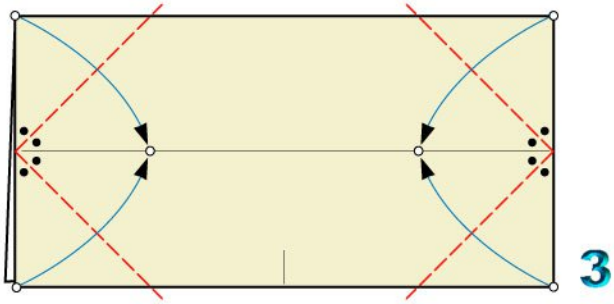
1

1 piega a valle, 2 più piccole e ruotate



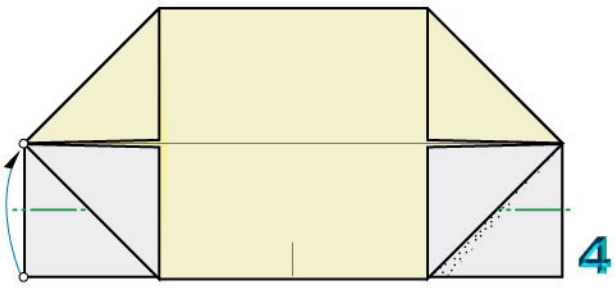
2

1 piega a valle



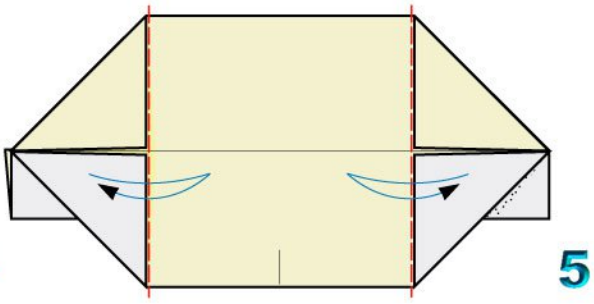
3

4 pieghe bisettrici a valle e ruotate



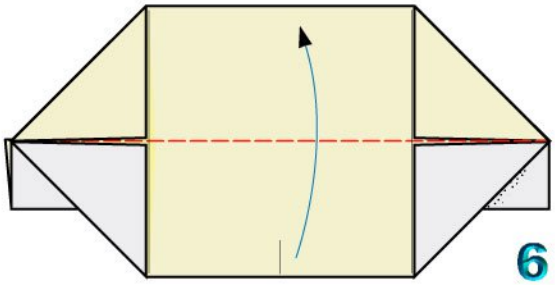
4

1 piega a monte (parzialmente nascosta) e ruotate



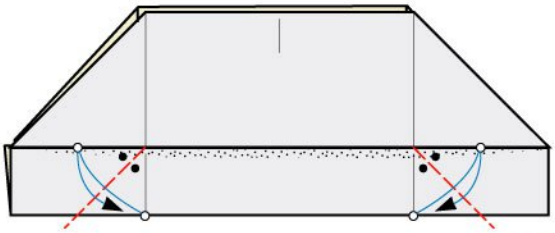
5

2 pieghe a valle



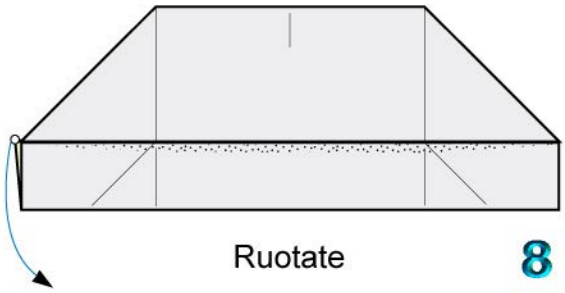
6

Ripiegando a valle ruotiamo
il bordo inferiore



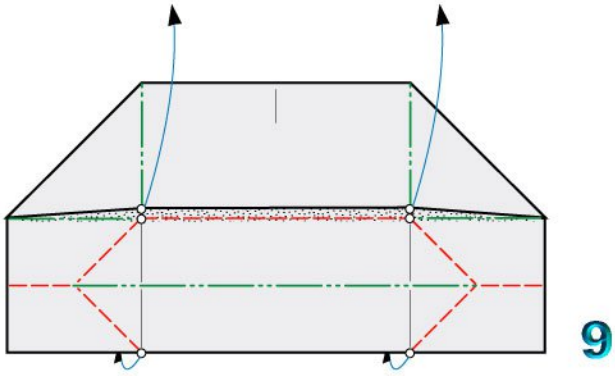
2 pieghe bisettrici a valle

7



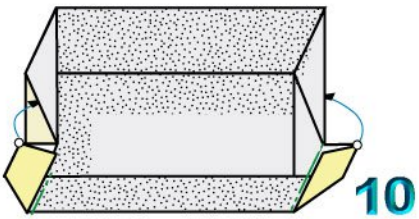
Ruotate

8



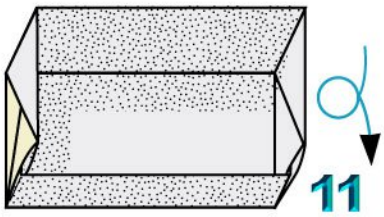
9

Ripiegando a monte ed a valle
ruotate modellando 3D



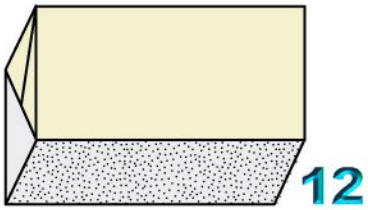
10

Ruotando all'indietro intascate
i vertici indicati



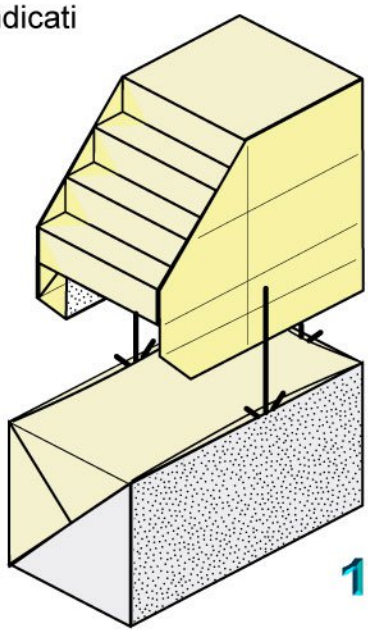
11

Ribaltate

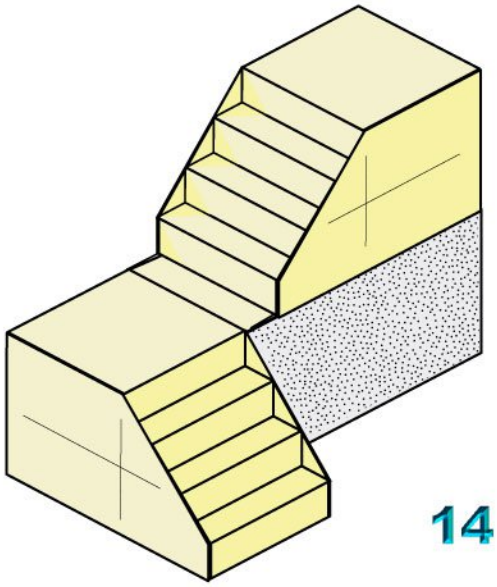


12

Pianerottolo ultimato



13



14

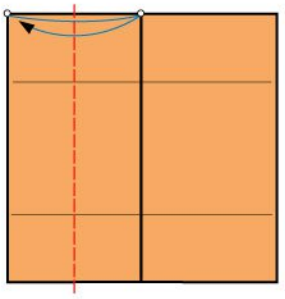
Montaggio della scala a 2 rampe: inserite i bordi di una rampa
nell'elemento pianerottolo ed accostatelo ad un'altra rampa

CAMMINO DI RONDA

Camminamento posto sulla sommità di un muro di un castello, protetto da un parapetto merlato.

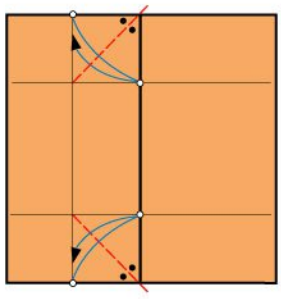
È formato da un piano di calpestio in lastre di pietra, da un parapetto e dai merli, costruiti in laterizio.

COSTRUZIONE DEL PIANO DI CALPESTIO



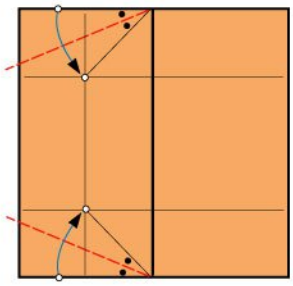
7

Partite dalla fig. n.6 del blocco A.
1 piega a valle



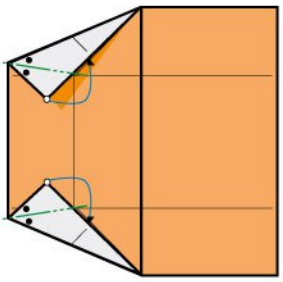
8

2 pieghe bisettrici a valle



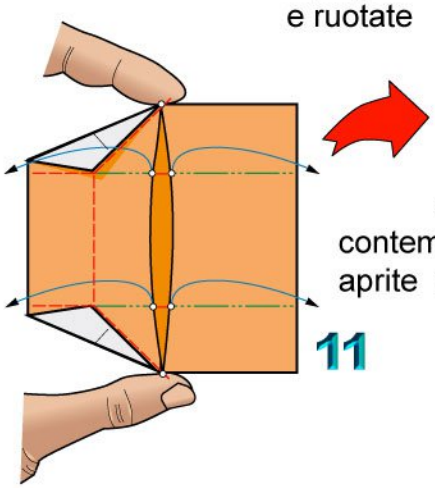
9

2 pieghe bisettrici a valle e ruotate



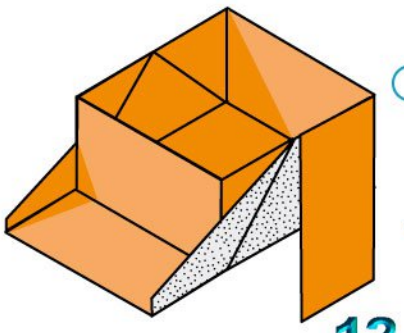
10

2 pieghe bisettrici a monte e ruotate



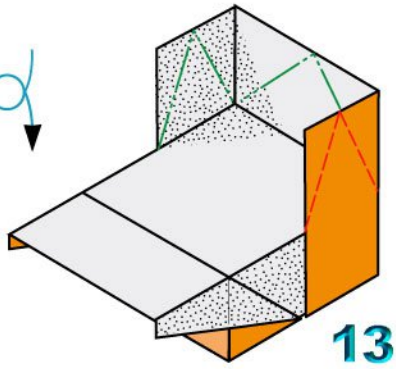
11

Ripiegando e comprimendo contemporaneamente, aprite modellando 3D



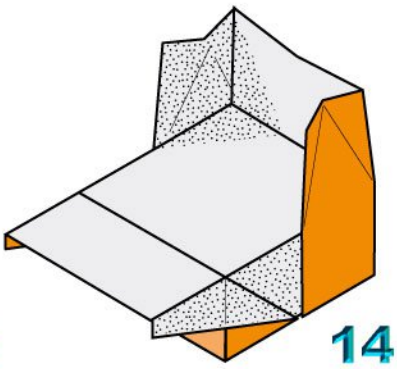
12

Ribaltate



13

Con una serie di pieghe a valle restringete il perimetro del bordo superiore



14

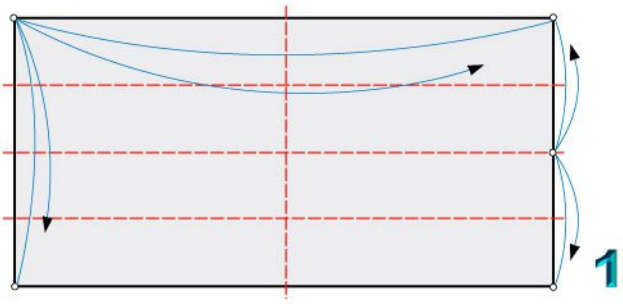
Piano di calpestio ultimato

COSTRUZIONE DI UN MERLO GHIBELLINO

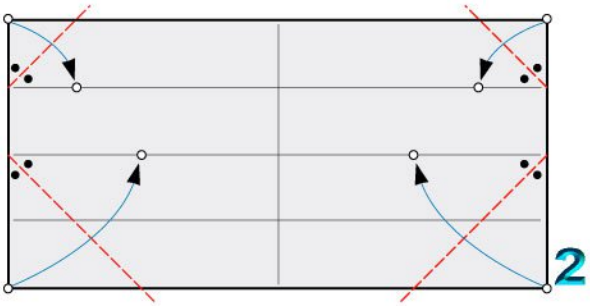
I merli sono dei rialzi del parapetto del cammino di ronda eretti ad intervalli regolari, progettati per difendere gli assediati dalle frecce nemiche.

All'occorrenza potevano anche essere scalzati per farli precipitare sugli assalitori che tentavano la scalata delle mura.

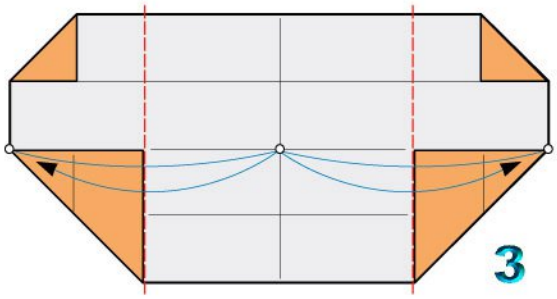
Quelli rettangolari erano detti guelfi e quelli a coda di rondine ghibellini.



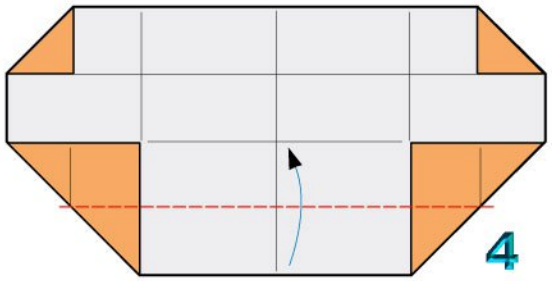
4 pieghe a valle



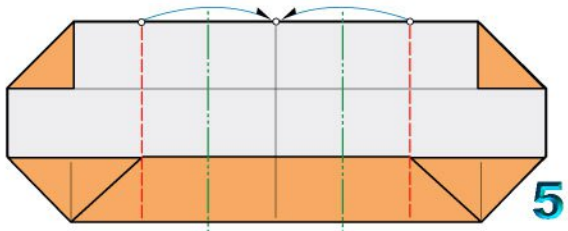
4 pieghe bisettrici a valle e ruotate



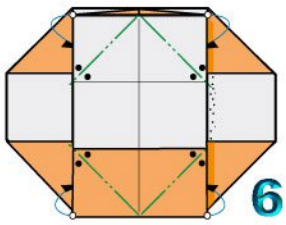
2 pieghe a valle



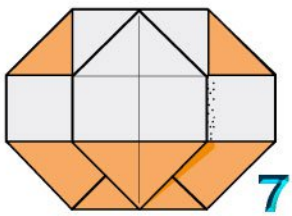
1 piega a valle e ruotate



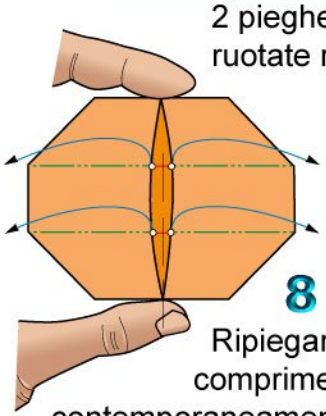
2 pieghe a monte e ruotate ripiegando a valle



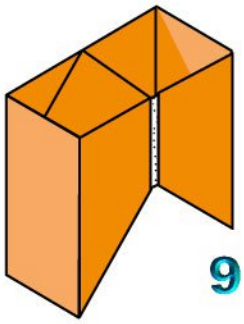
4 pieghe a monte e ruotate all'interno



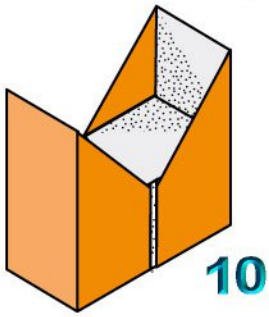
Ribaltate



Ripiegando e comprimendo contemporaneamente, aprite modellando 3D

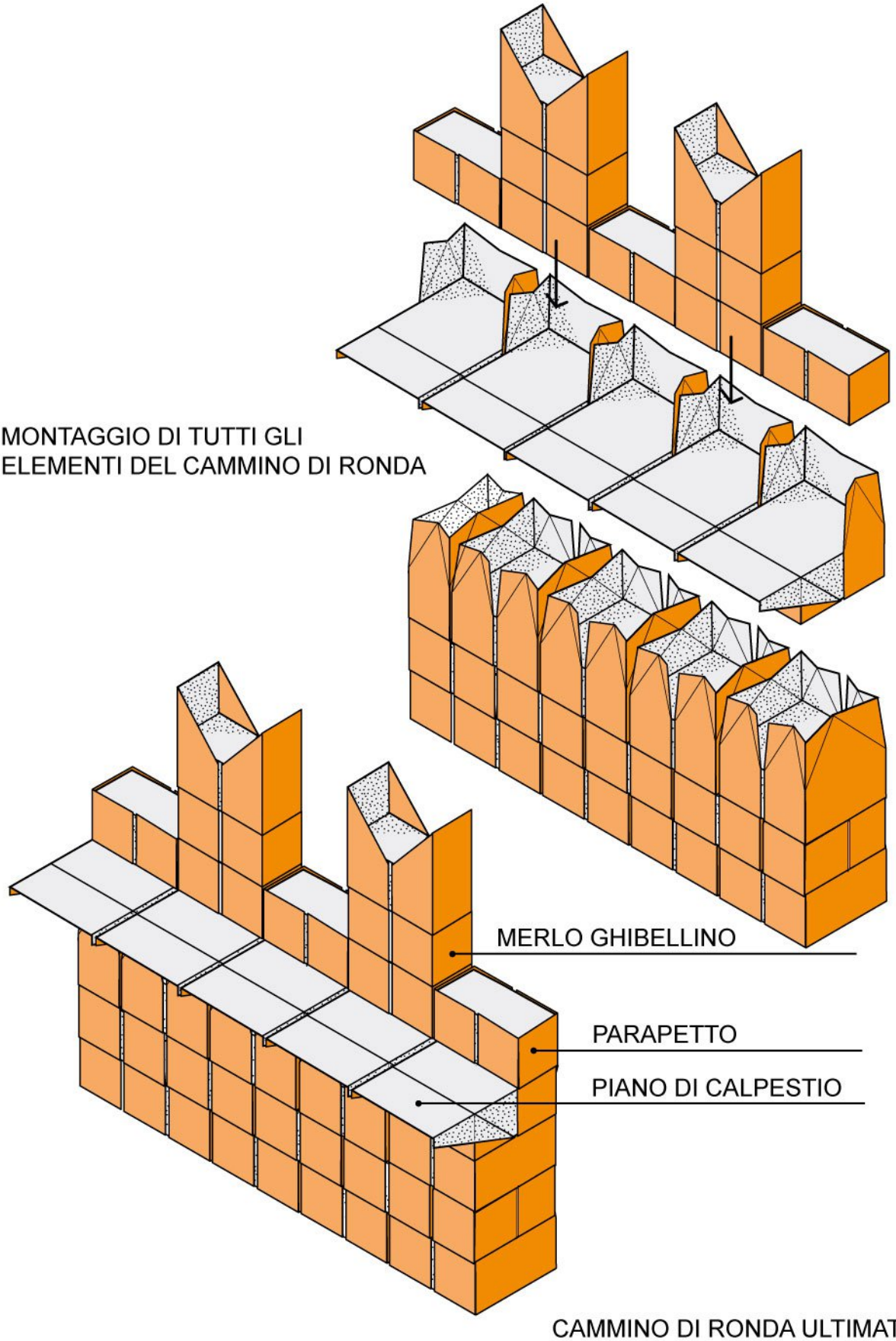


Ribaltate



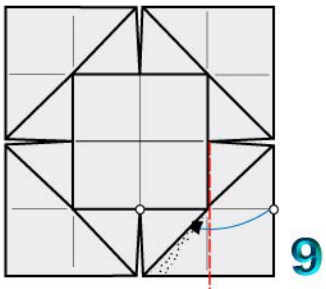
Completate il merlo montandolo su un blocco B

MONTAGGIO DI TUTTI GLI
ELEMENTI DEL CAMMINO DI RONDA



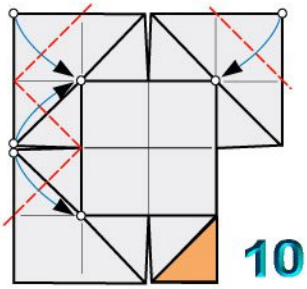
CAMMINO DI RONDA ULTIMATO

COSTRUZIONE DI UN MERLO GHIBELLINO ANGOLARE



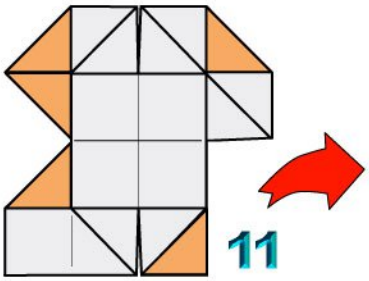
9

Partite dalla fig. n. 8 del blocco A4. 1 piega rovescia interna



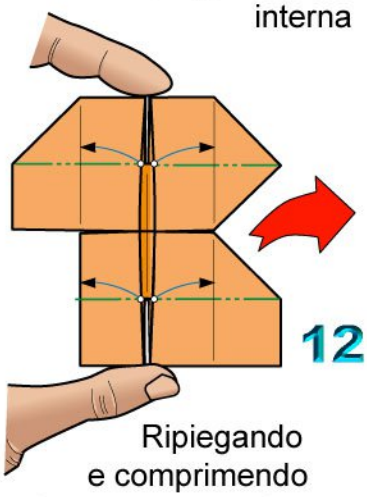
10

4 pieghe a valle e ruotate



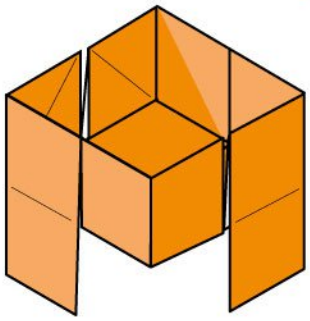
11

Ribaltate



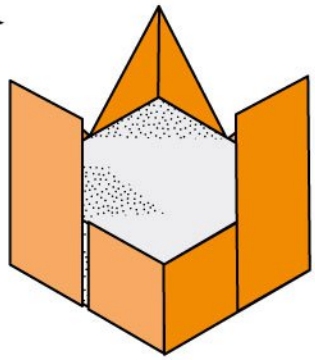
12

Ripiegando e comprimendo contemporaneamente, aprite modellando 3D



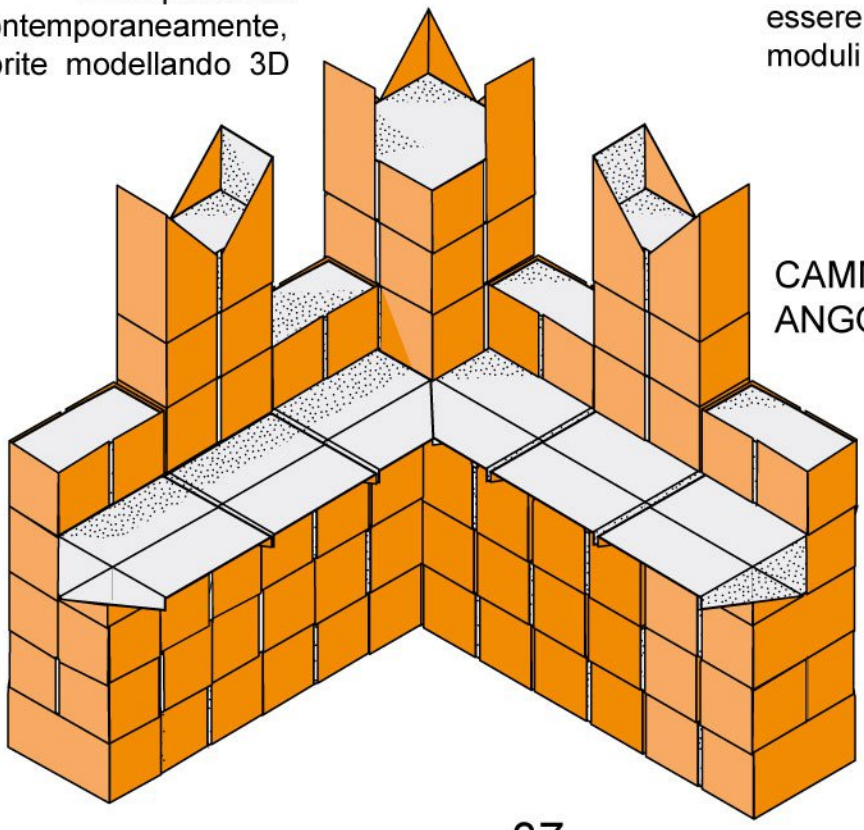
13

Ribaltate



14

La sommità ultimata deve essere montata su altri 2 moduli A



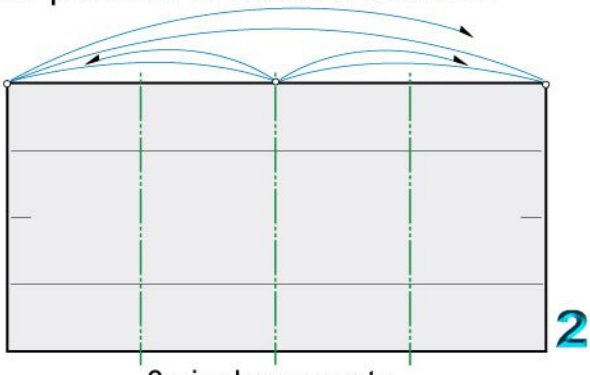
CAMMINO DI RONDA ANGOLARE ULTIMATO

CAMMINO DI RONDA A SBALZO CON PIOMBATOIE

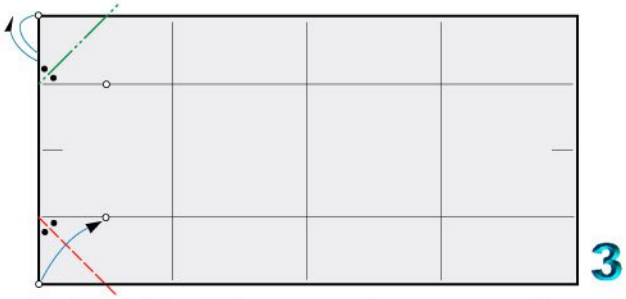
Le piombatoie sono aperture sottostanti un cammino di ronda a sbalzo e sostenuto da mensole di pietra, progettate per agevolare il getto di pietre o liquidi bollenti sugli assalitori in procinto di scalare le mura.



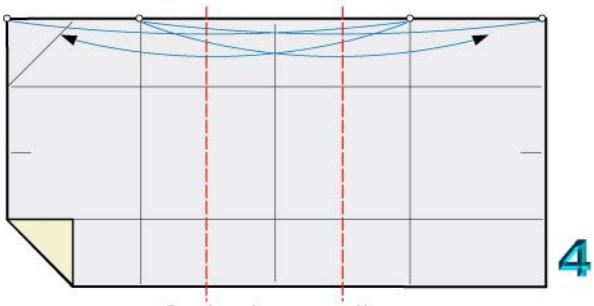
Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 longitudinali



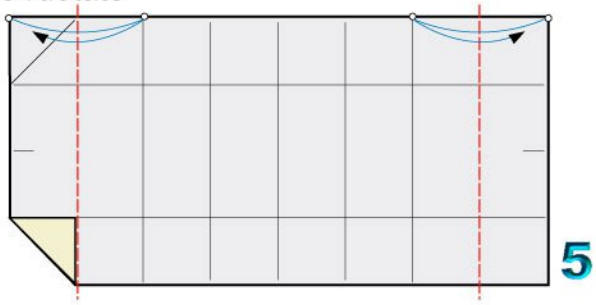
3 pieghe a monte



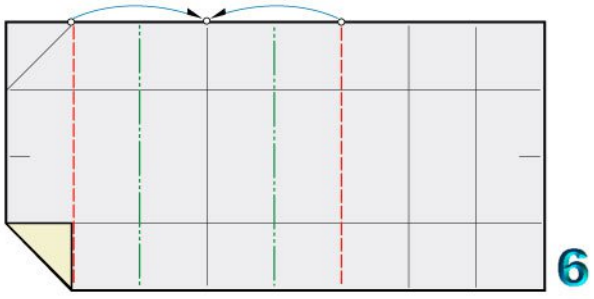
1 piega bisettrice a monte, una a valle e ruotate



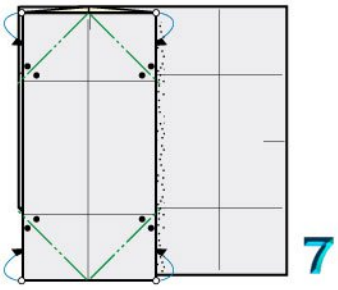
2 pieghe a valle



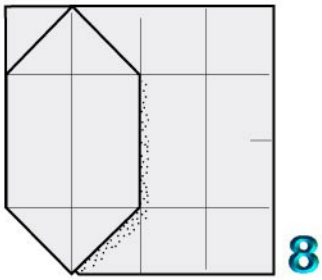
2 pieghe a valle



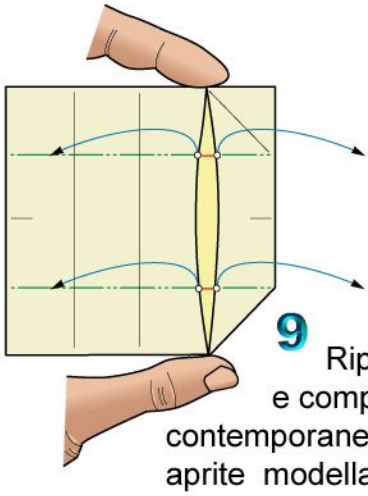
Ruotate ripiegando a valle ed a monte



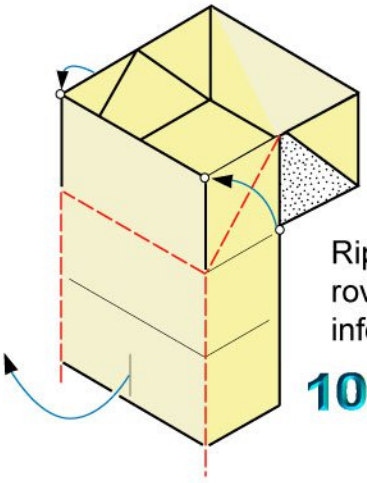
4 pieghe bisettrici a monte e ruotate all'interno



Ribaltate

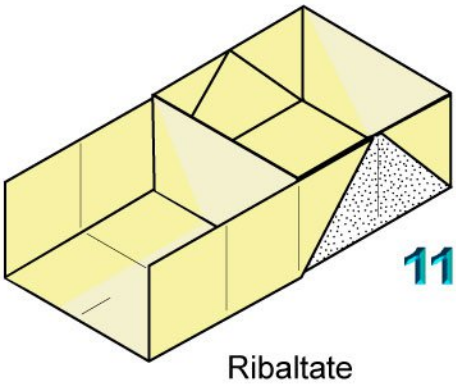


9 Ripiegando e comprimendo contemporaneamente, aprite modellando 3D

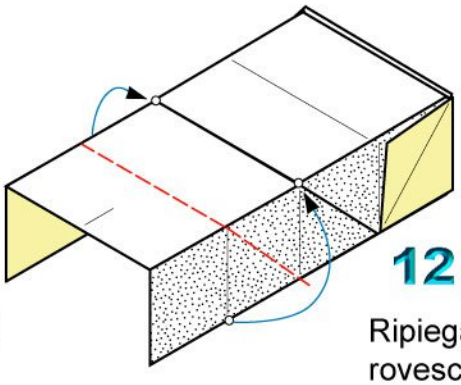


Ripiegando a valle rovesciate il bordo inferiore modellando 3D

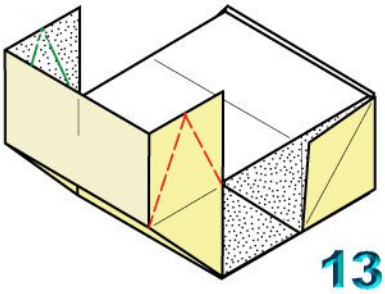
10



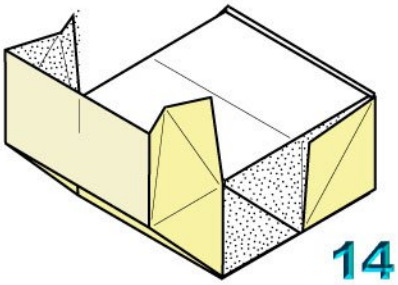
11 Ribaltate



12 Ripiegando a valle rovesciate il bordo indicato

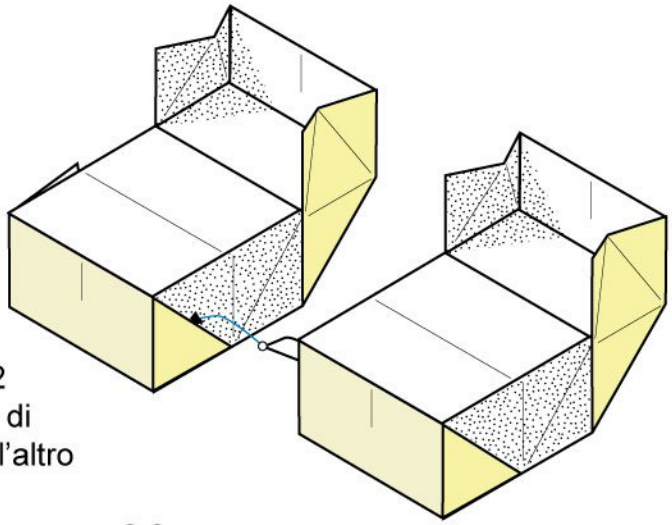


13

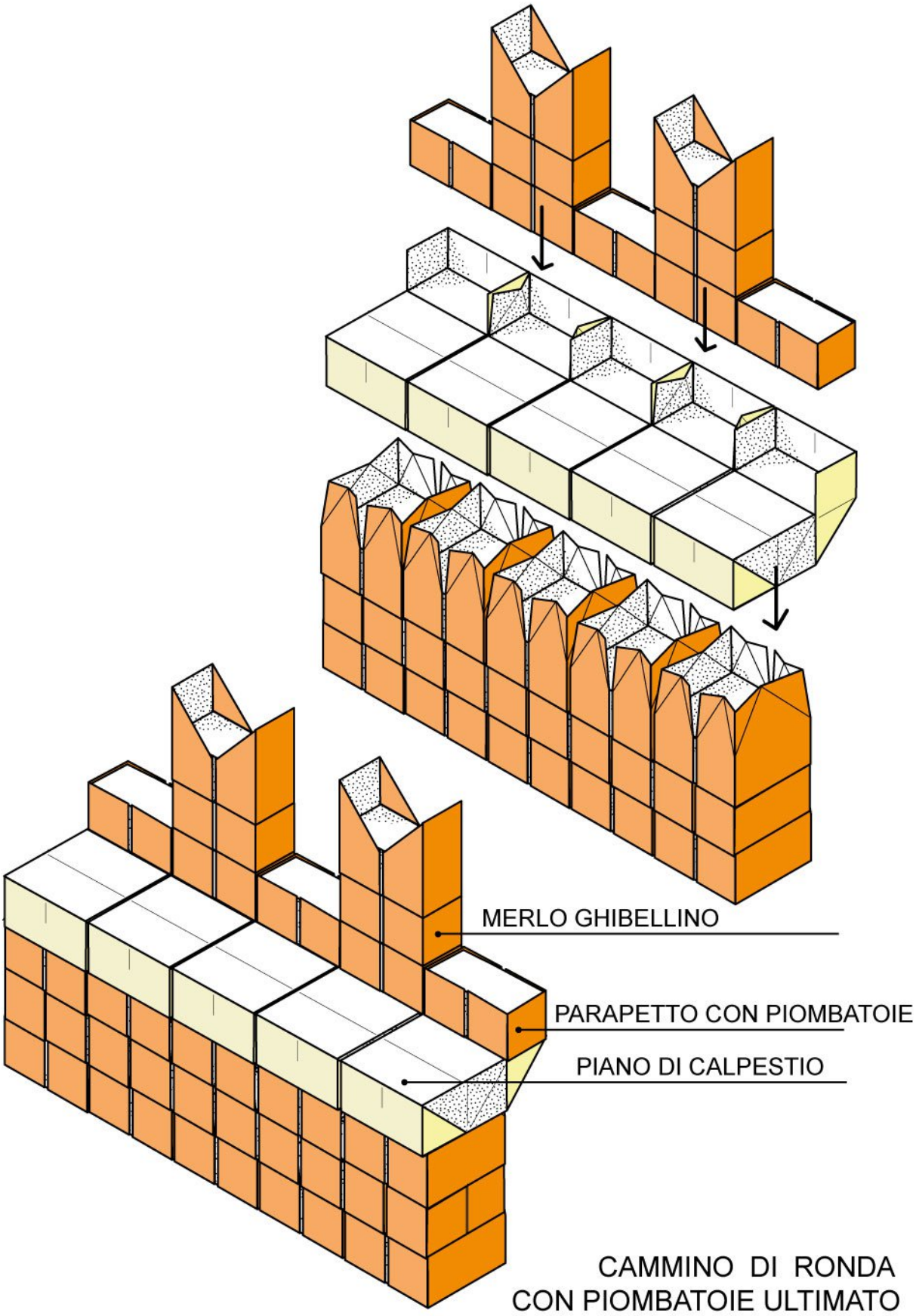


14

Con una serie di pieghe a valle restringete perimetro del bordo superiore



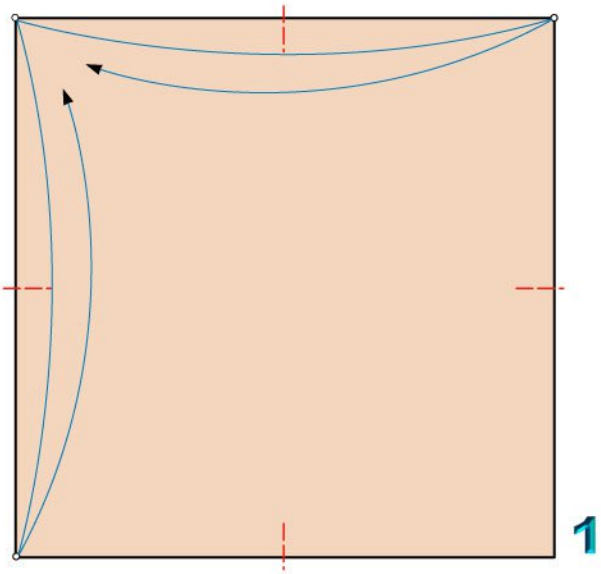
Per collegare saldamente 2 elementi inserite un vertice di uno nella tasca laterale dell'altro



CAMMINO DI RONDA
CON PIOMBATOIE ULTIMATO

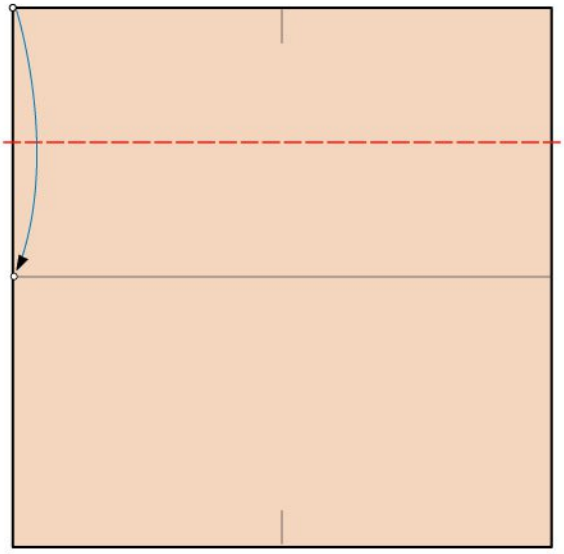
PONTE LEVATOIO

Era costruito in legno,incernierato ad un'estremità e sollevabile dall'altra, a protezione dell'ingresso di un castello circondato da un fossato.



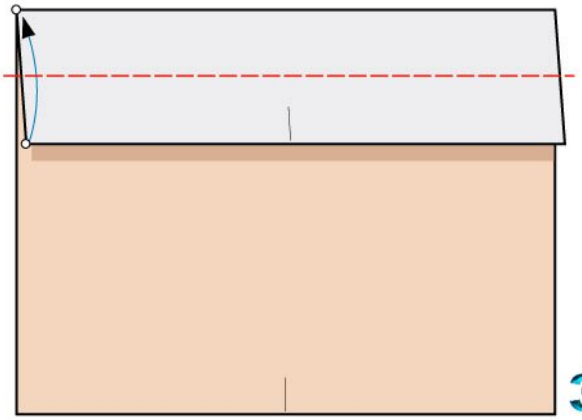
1

4 piccole pieghe a valle



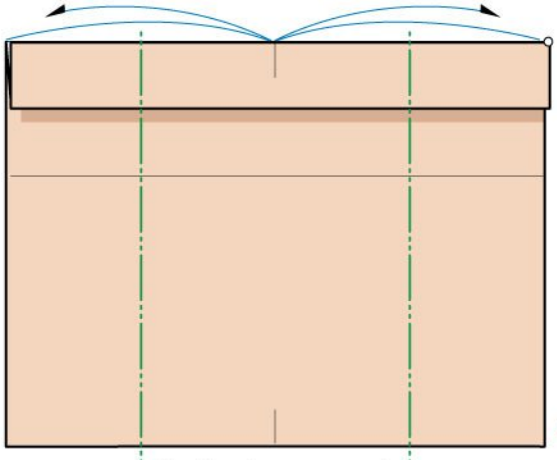
2

1 piega a valle e ruotate



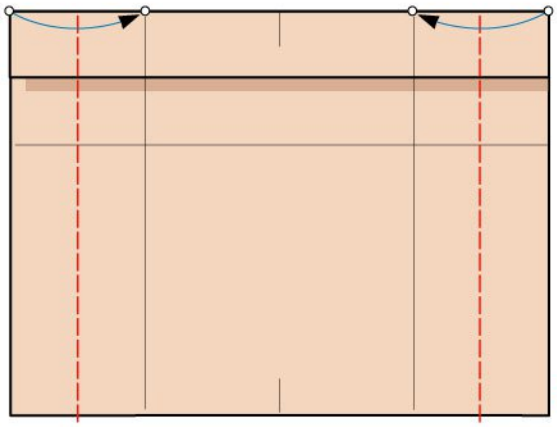
3

1 piega a valle e ruotate



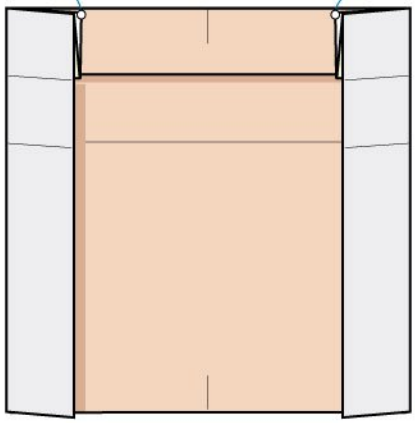
4

2 pieghe a monte



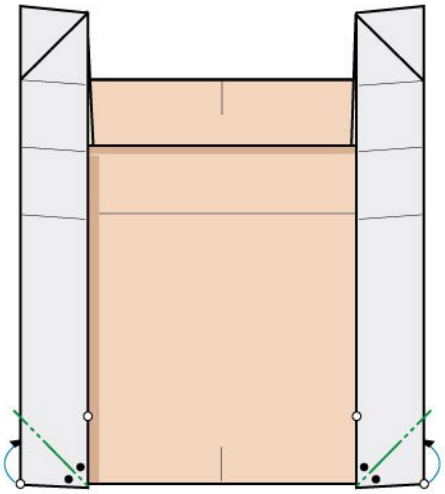
5

2 pieghe a valle

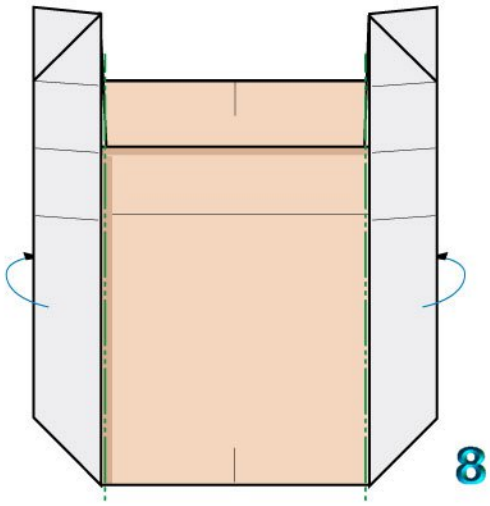


6

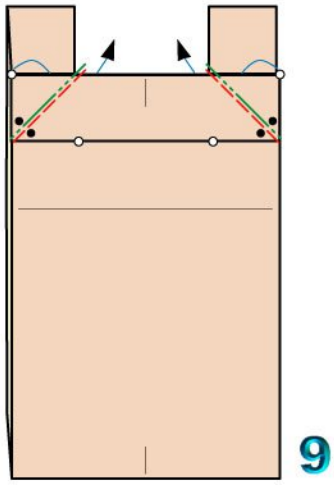
2 piccole pieghe a valle (non visibili) ed estraete 2 superfici quadrate



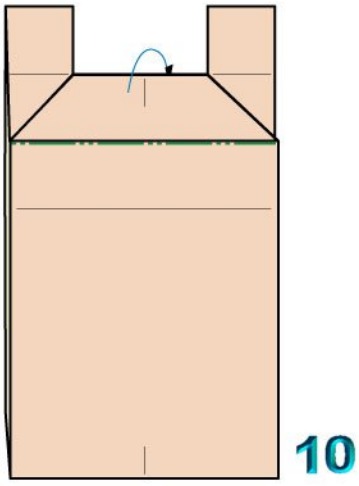
2 pieghe bisettrici a monte e ruotate



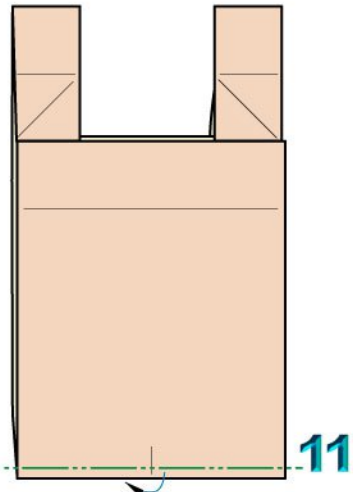
Ripiegando a monte ruotate



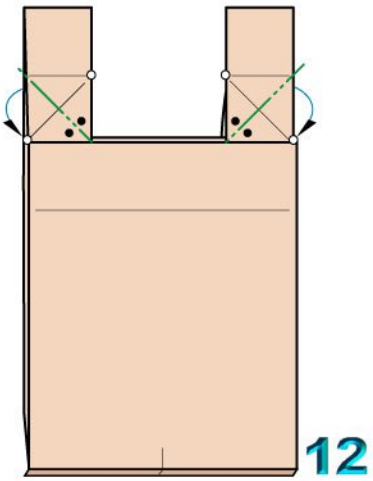
2 pieghe rovesce interne



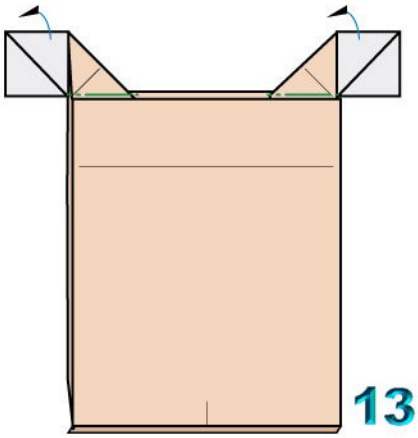
1 piega rovescia interna



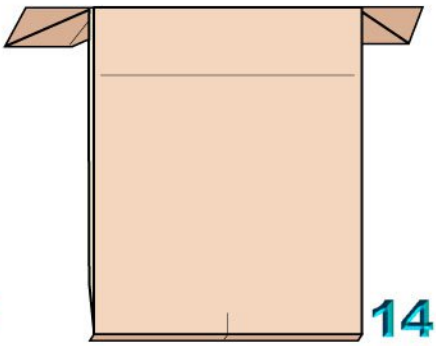
1 piega a monte



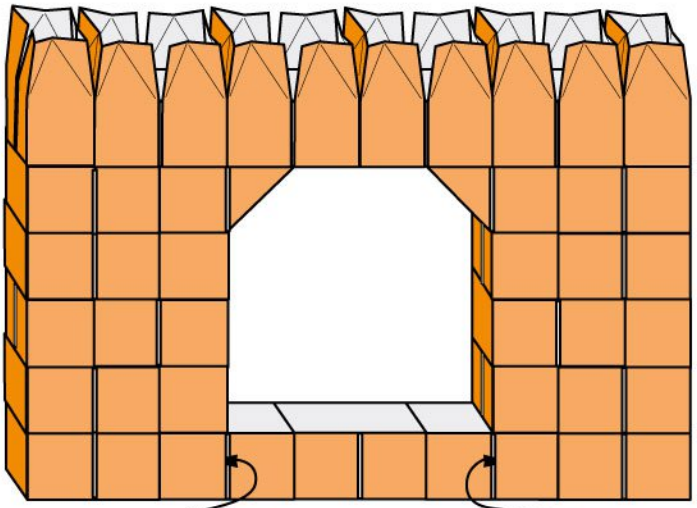
2 pieghe bisettrici
a monte e ruotate



2 pieghe a monte e
ruotate verso il basso



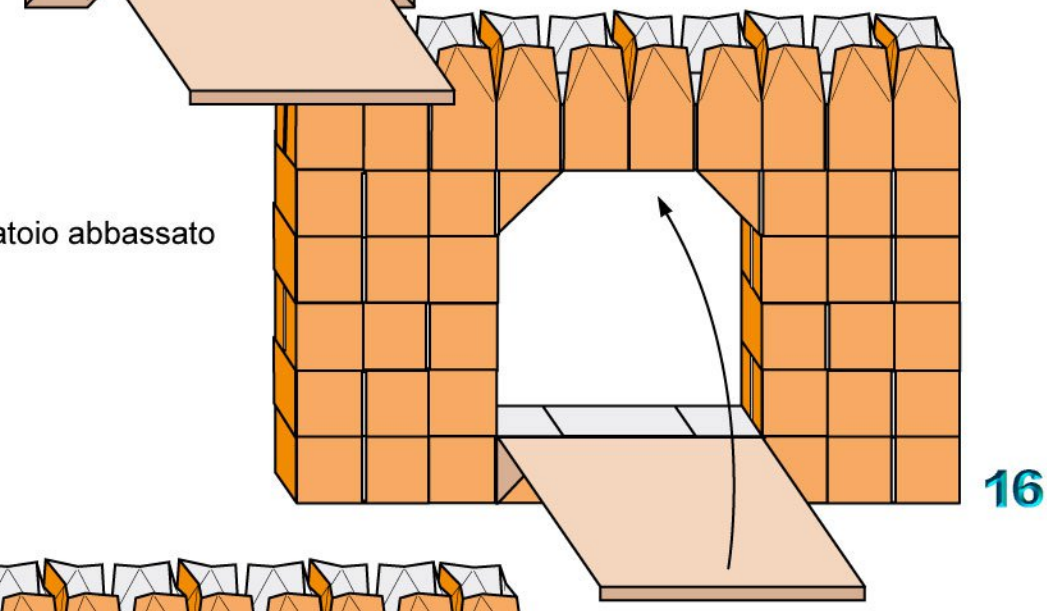
ponte levatoio
ultimato



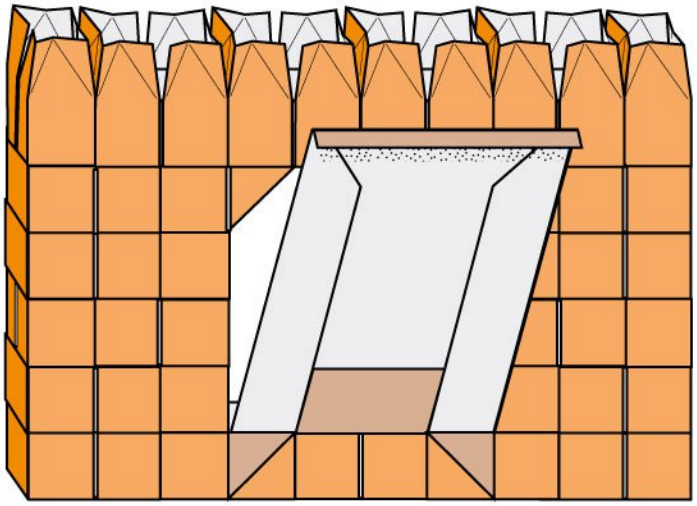
Montaggio del ponte levatoio:
inserite le appendici laterali
del ponte nelle fessure centrali
di 2 blocchi A2

15

Ponte levatoio abbassato



16



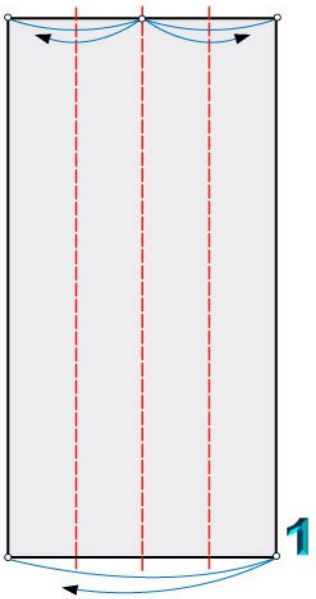
Ponte levatoio alzato

17

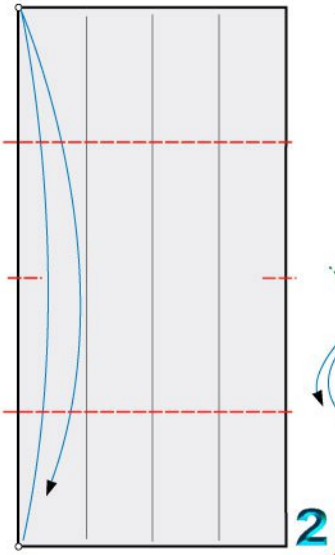
PORTA A BATTENTI

Adoperate 2 fogli di carta tinta legno per realizzare una porta gotica a 2 battenti.

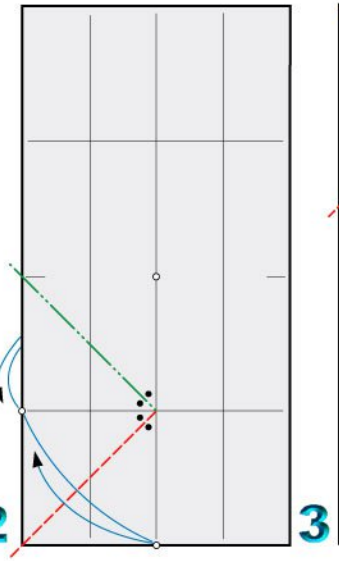
Si tratta di una costruzione complessa per cui in certi casi forse è preferibile usare semplicemente le forbici.



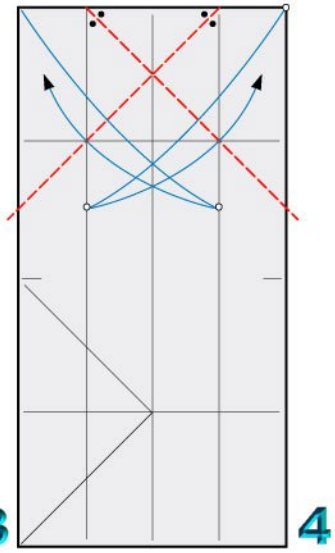
3 pieghe a valle



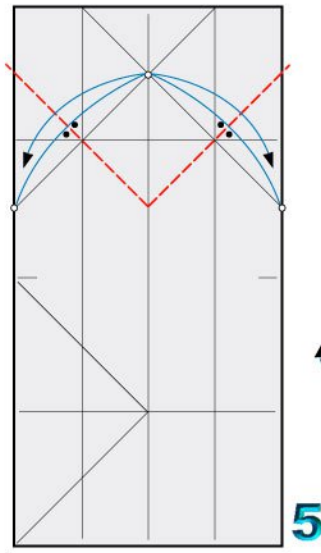
4 pieghe a valle,
2 piccole



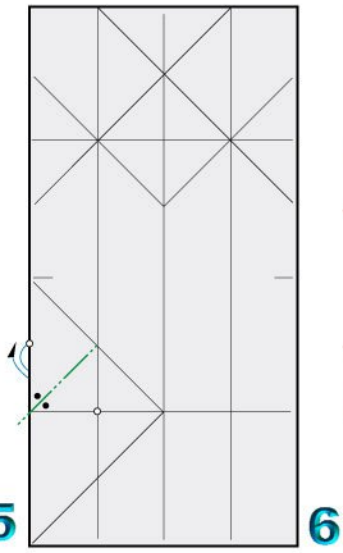
1 piega bisettrice
a valle ed 1 a monte



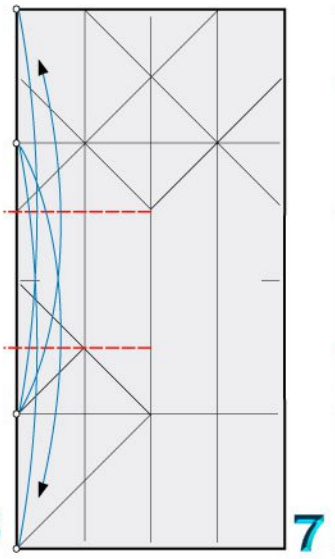
2 pieghe bisettrici
a valle



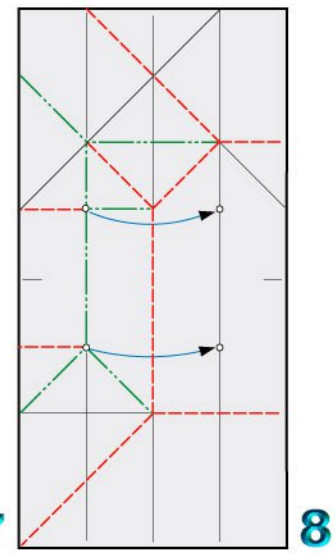
2 pieghe bisettrici
a valle



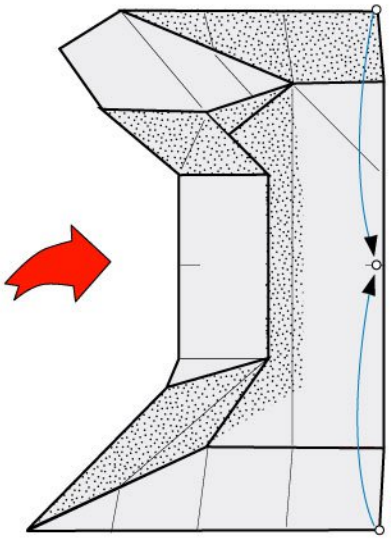
1 piega bisettrice
a monte

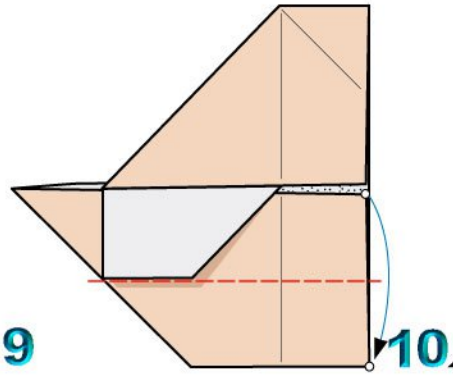


2 pieghe a valle

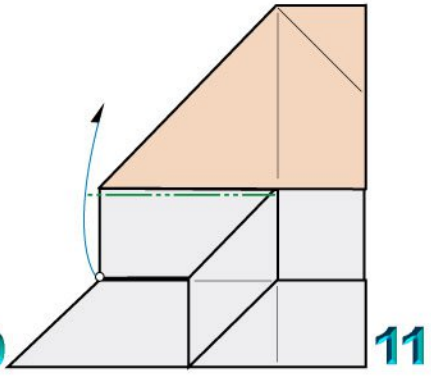


Ruotate ripiegando
a valle ed a monte

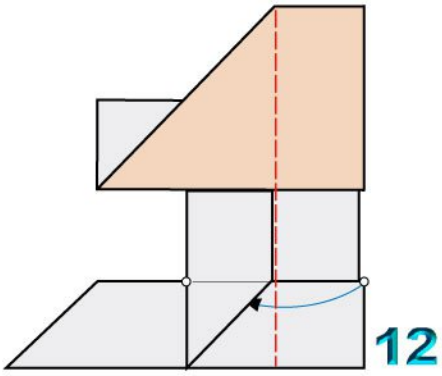




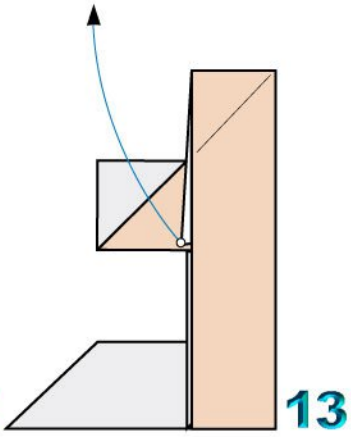
1 piega a valle e ruotate



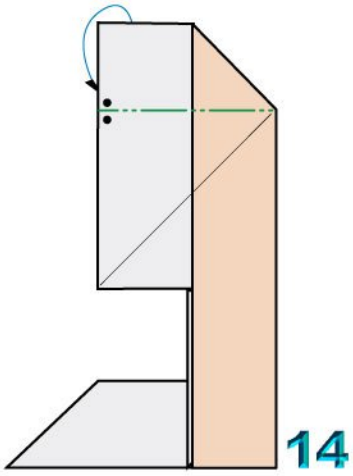
1 piega a monte e ruotate all'indietro



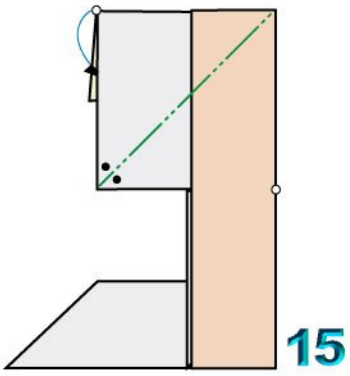
1 piega a valle e ruotate intascando



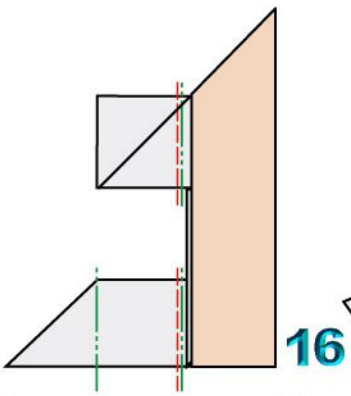
estraete



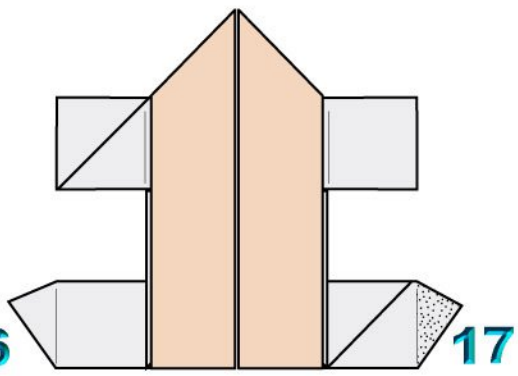
1 piega bisettrice a monte e ruotate all'indietro



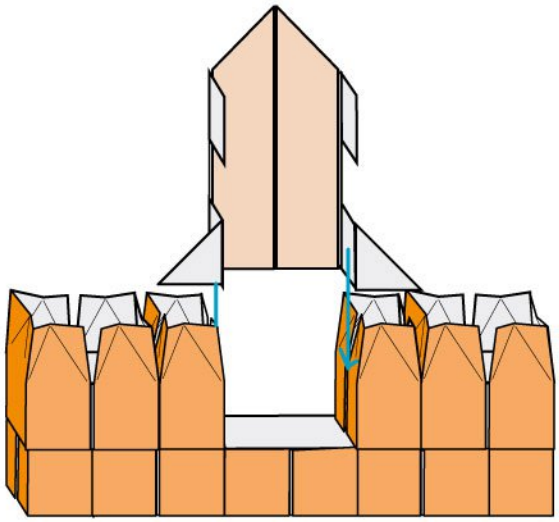
1 piega bisettrice a monte e ruotate all'indietro



1 piega a monte e ruotate a 90°. 2 pieghe a valle ed a monte per creare 2 cerniere

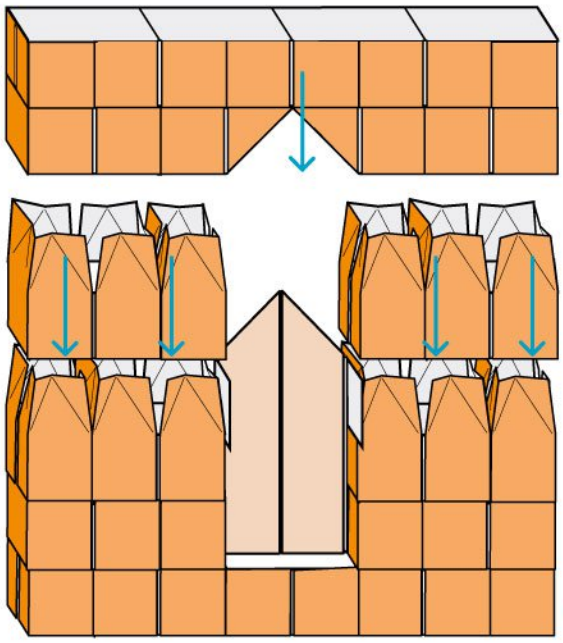


porta a 2 ante completata



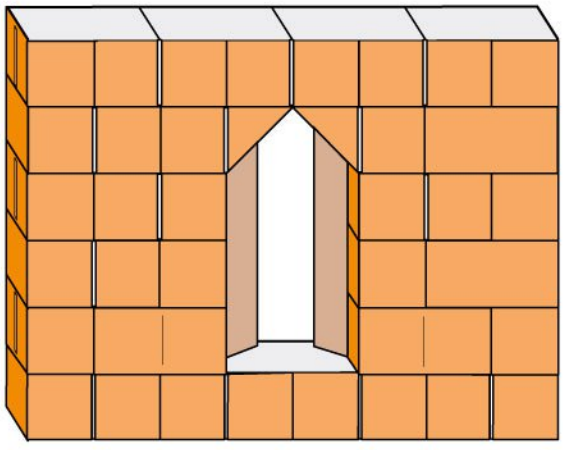
Montaggio della porta: inserite le appendici laterali inferiori della porta nelle fessure centrali di 2 semiblocchi B

18



Inserite le appendici laterali superiori della porta nelle fessure centrali di 2 semiblocchi B

19

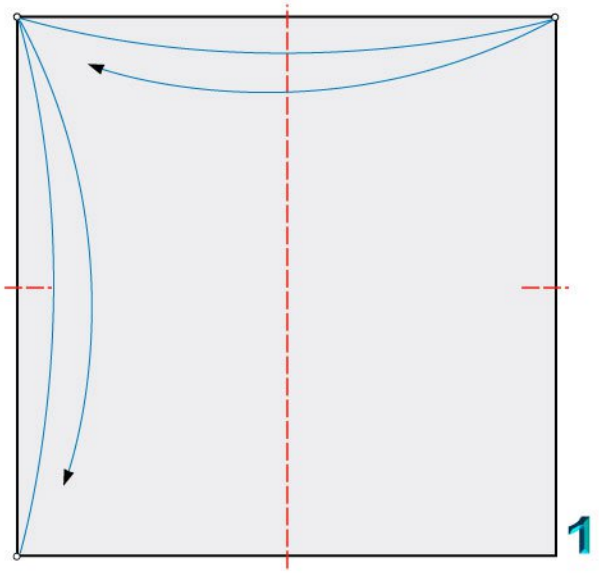


Porta gotica a 2 battenti ultimata

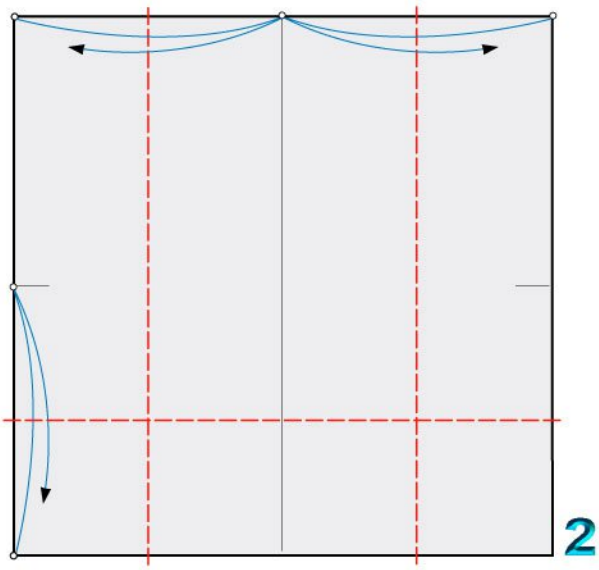
20

PORTONE A BATTENTI

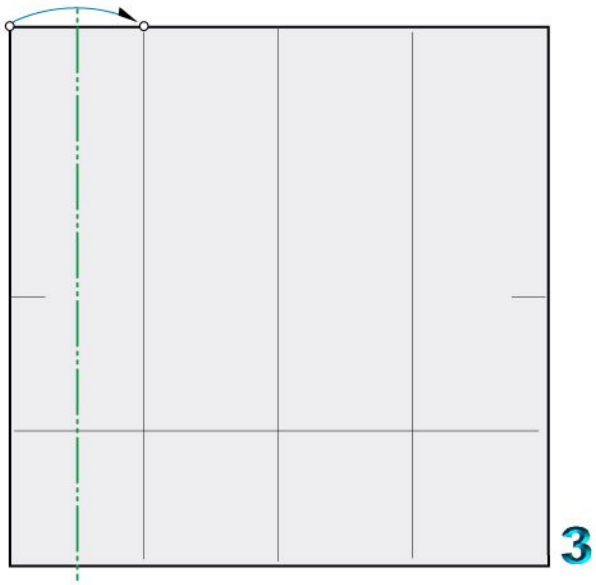
Adoperate 2 fogli di carta tinta legno per realizzare un portone a 2 battenti.
Si tratta di una costruzione elaborata per cui in certi casi forse è preferibile usare semplicemente le forbici.



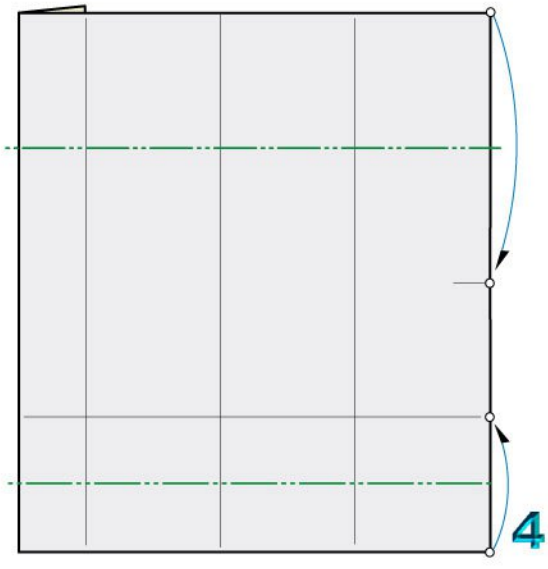
3 pieghe a valle, 2 piccole



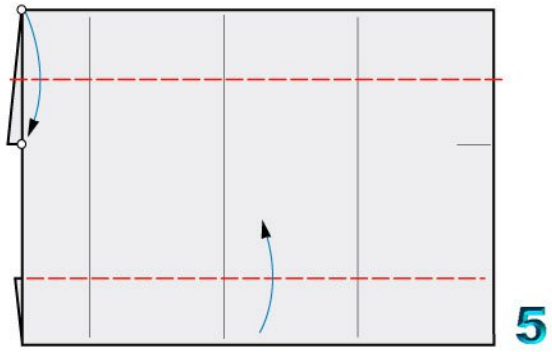
3 pieghe a valle



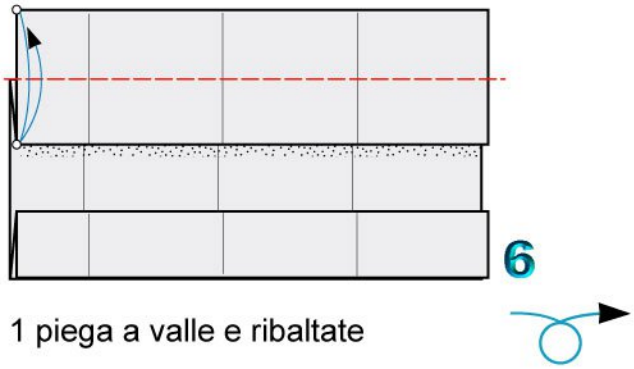
1 piega a monte e ruotate



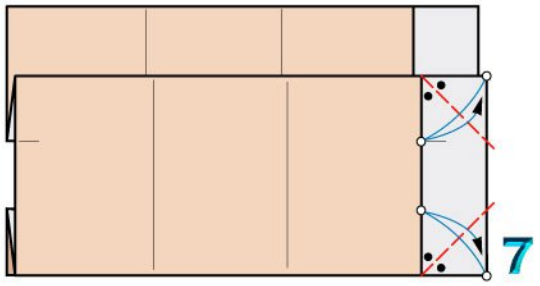
2 pieghe a monte e ruotate



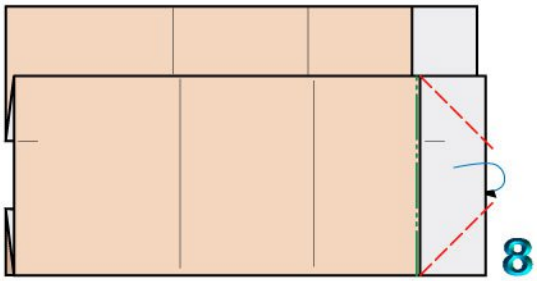
2 pieghe a valle e ruotate



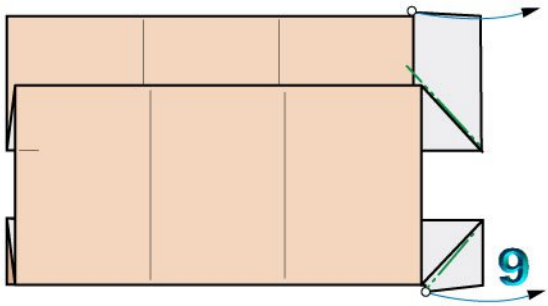
1 piega a valle e ribaltate



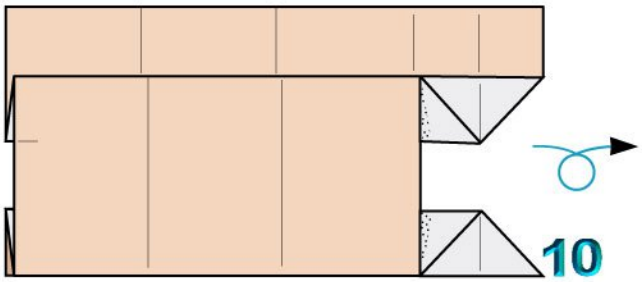
2 pieghe bisettrici a valle



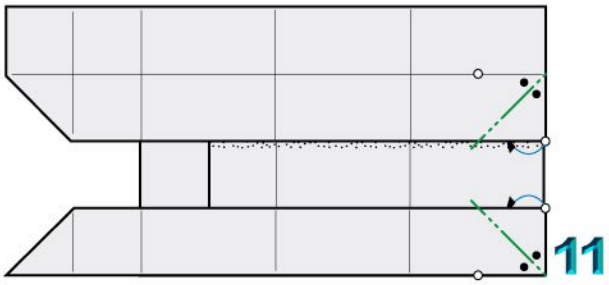
Ripiegando a valle ed a monte
ruotate all'interno la superficie indicata



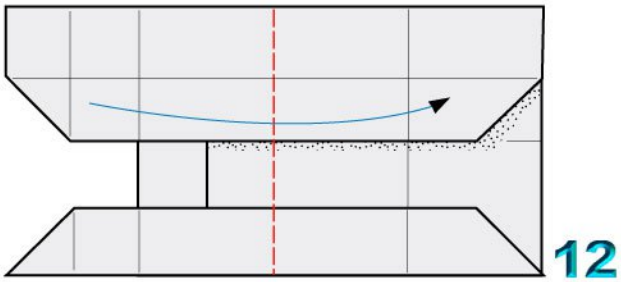
Estraete le 2 appendici indicate



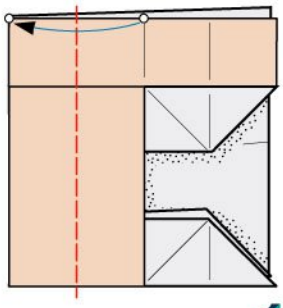
Ribaltate



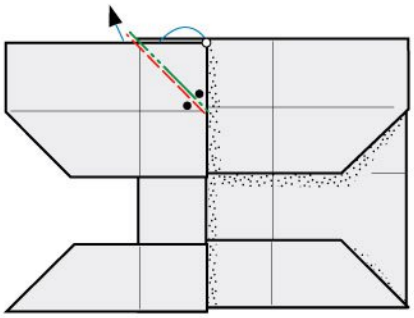
2 pieghe a monte e ruotate all'interno



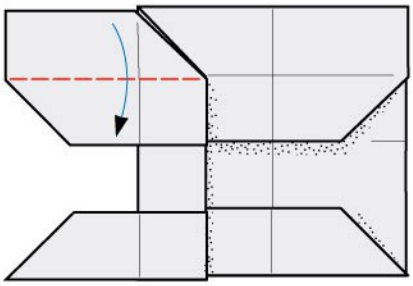
1 piega a valle e ruotate



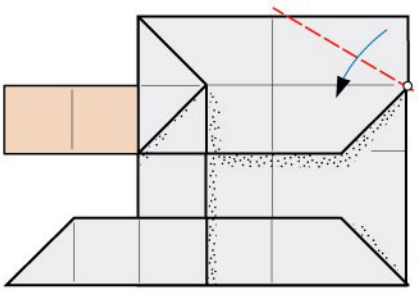
1 piega a valle e ruotate **13**



1 piega rovescia interna **14**

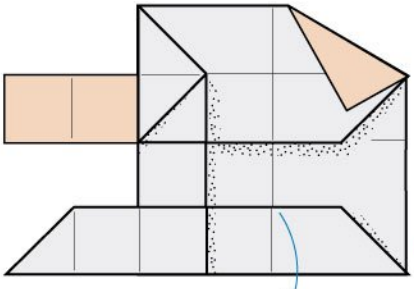


Ruotate ripiegando a valle **15**



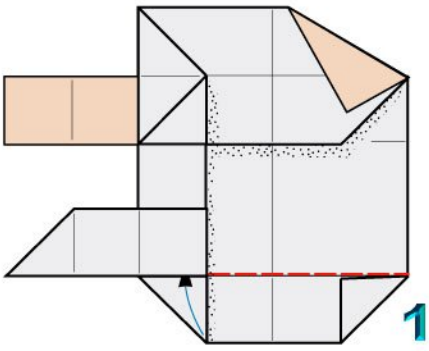
16

1 piega a valle e ruotate



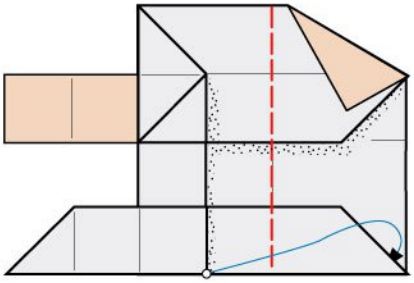
17

1 piega a valle ed 1 a monte nascoste, e ruotate



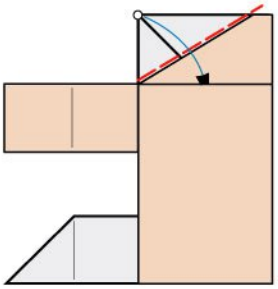
18

1 piega a valle e ruotate intascando



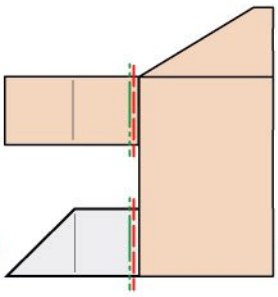
19

1 piega a valle e ruotate intascando



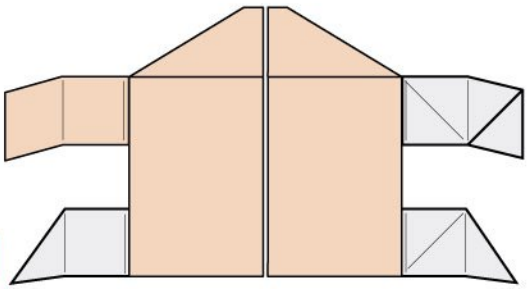
20

1 piega a valle e ruotate intascando e bloccando

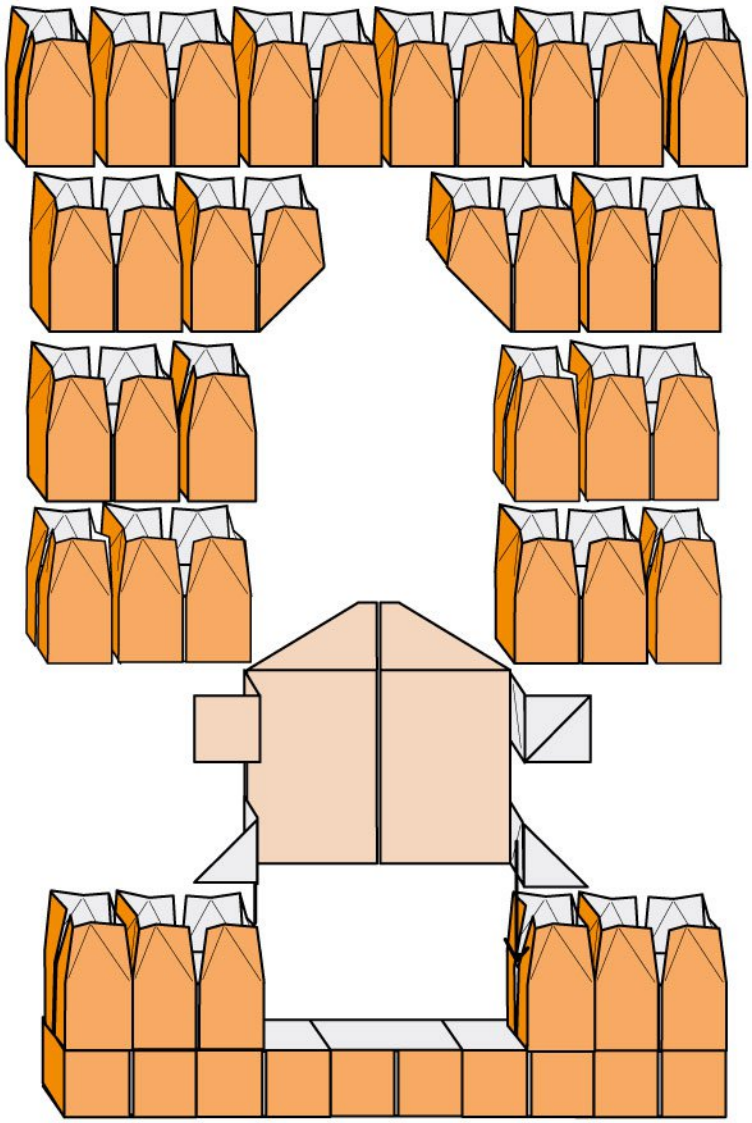


21

2 pieghe a valle, 2 a monte sovrapposte per creare 2 cerniere
Anta di portone ultimata

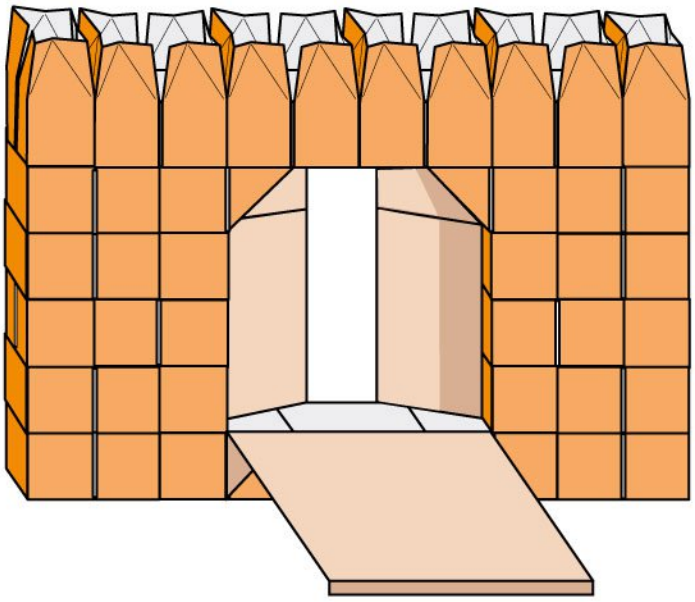


portone a 2 ante ultimato



Montaggio del portone: inserite le appendici laterali del portone nelle fessure centrali di 4 semiblocchi B

1



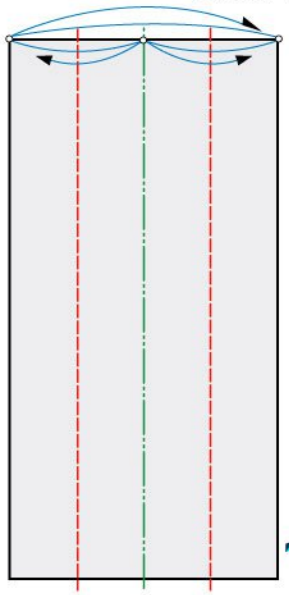
Portone montato con inserito un ponte levatoio

2

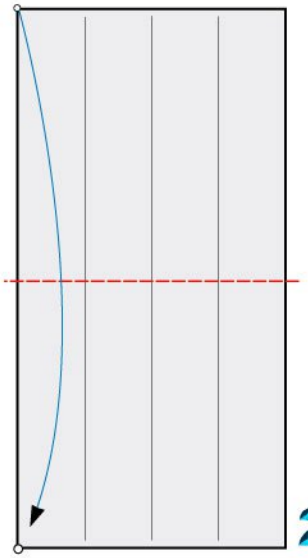
BIFORA

Finestra di un edificio civile o religioso divisa da una colonnina in due aperture ad arco. Adoperate carta bicolore per la costruzione dei blocchi A3 e carta chiara per la colonnina.

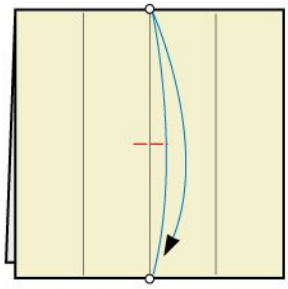
COSTRUZIONE DELLA COLONNINA



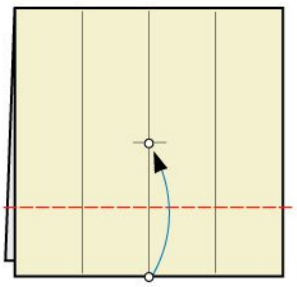
1 piega a monte e 2 a valle



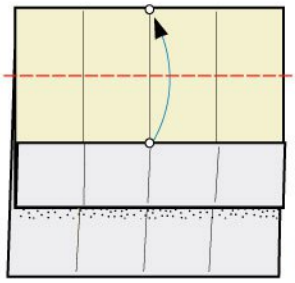
1 piega a valle e ruotate



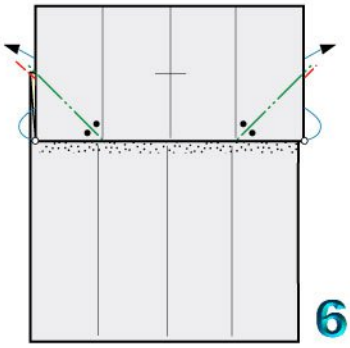
1 piega a valle



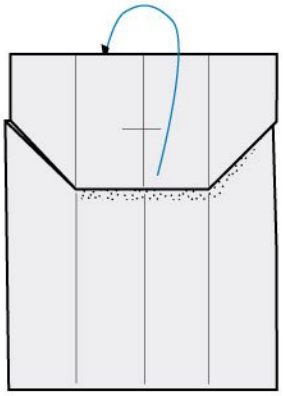
1 piega a valle e ruotate



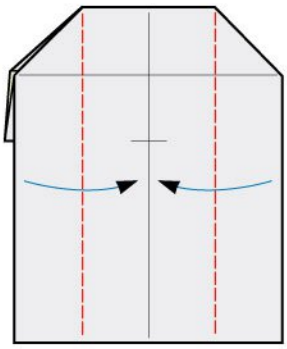
1 piega a valle e ruotate



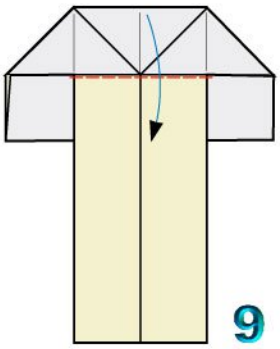
2 pieghe rovesce interne



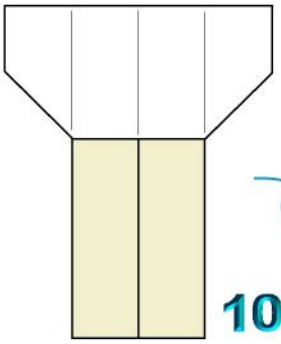
Ruotate



2 pieghe a valle e ruotate

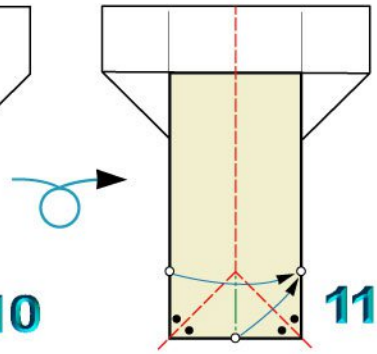


1 piega a valle e ruotate



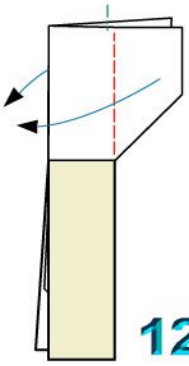
10

Ribaltate



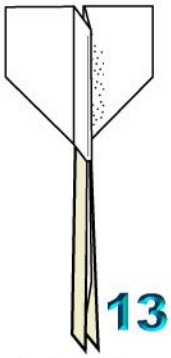
11

2 pieghe bisettrici a valle, e ruotate ripiegando



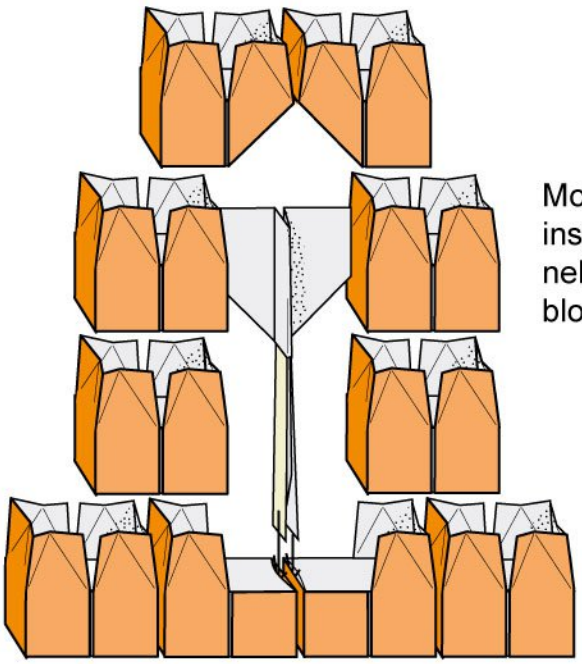
12

2 pieghe a valle, 1 per lato, e ruotate di 90°



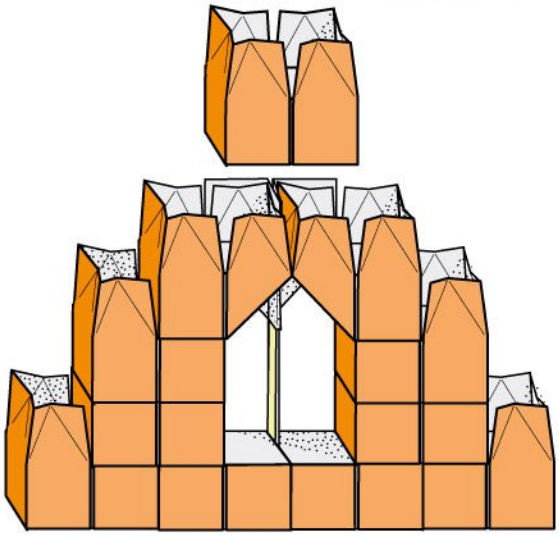
13

Colonnina ultimata



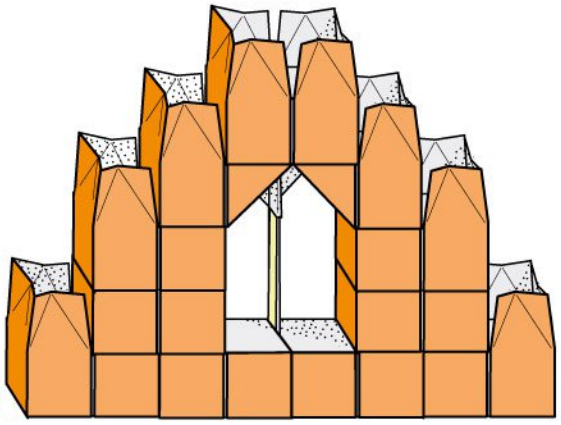
14

Montaggio della colonnina: inserite le appendici inferiori nelle fessure laterali di 2 blocchi A2



15

Bloccate il bordo superiore della colonnina inserendolo in un blocco A

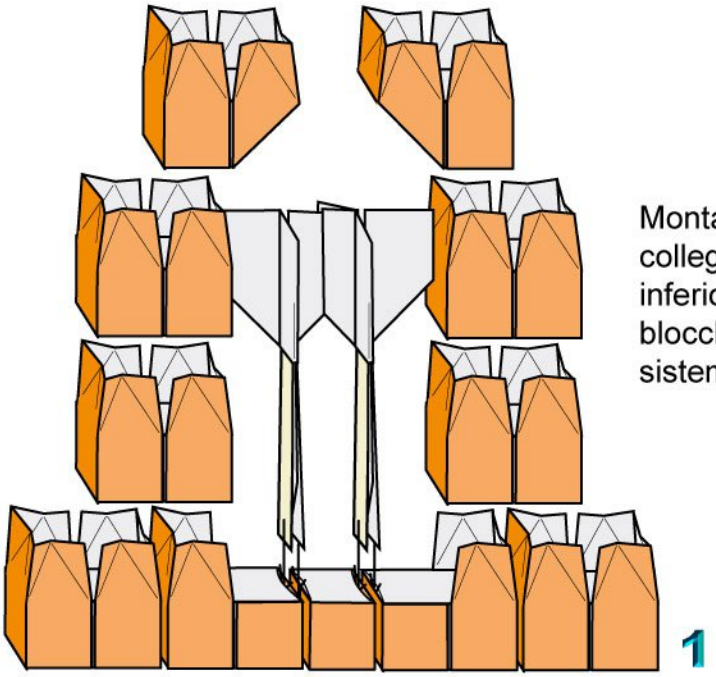


16

Bifora ultimata

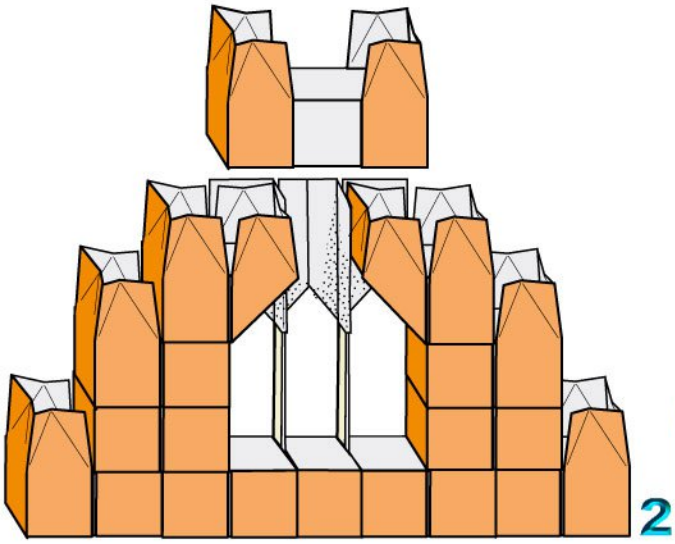
TRIFORA

Finestra di un edificio civile o religioso divisa da una colonnina in tre aperture ad arco.Adoperate carta bicolore per la costruzione dei blocchi A3 e carta chiara per la colonnina.



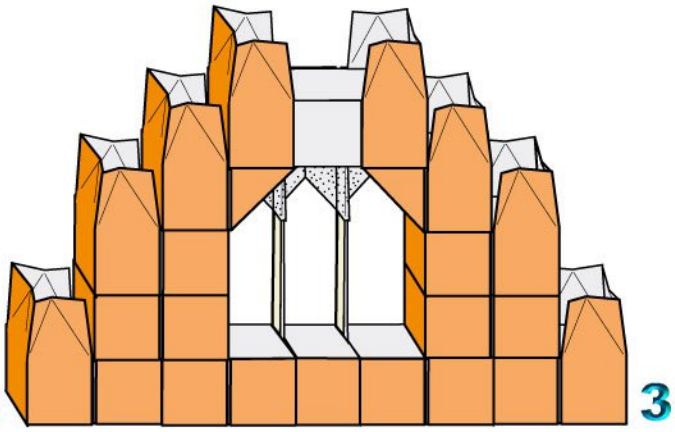
1

Montaggio delle colonnine: collegatele e inserite le appendici inferiori nelle fessure laterali di 2 blocchi A2 e di un semiblocco B1 sistemato al centro



2

Bloccate i bordi superiori delle colonnine inserendoli in un blocco A3

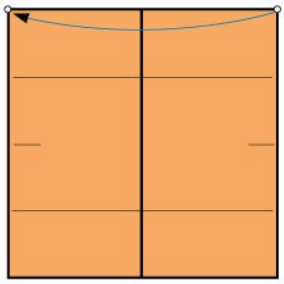


3

Trifora ultimata

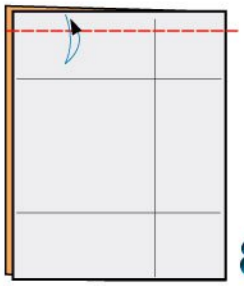
FERITOIA

Stretta apertura verticale nelle mura di un castello progettata per permettere ai difensori di scagliare frecce sugli assalitori. Particolarmente importanti quelle poste ai lati delle torri perchè permettevano di colpire gli assalitori sui fianchi.



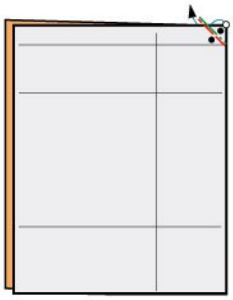
7

Partite dalla fig. n.6 del blocco A. Ruotate



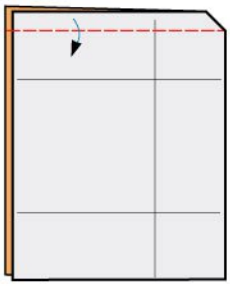
8

1 piega a valle



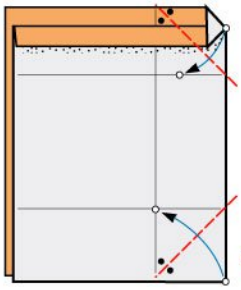
9

1 piega rovescia interna



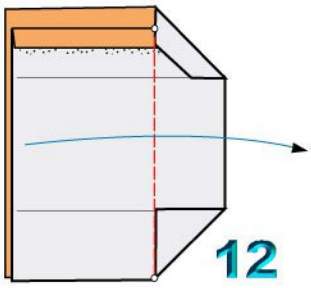
10

Ruotate ripiegando a valle



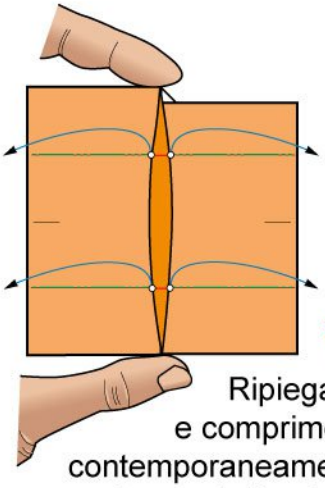
11

2 pieghe bisettrici a valle e ruotate



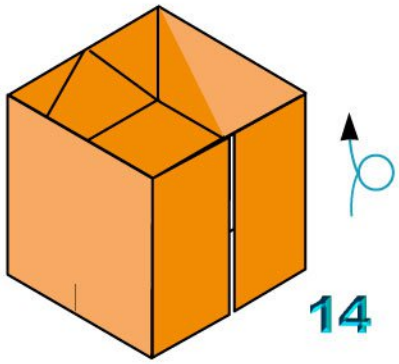
12

Aprite



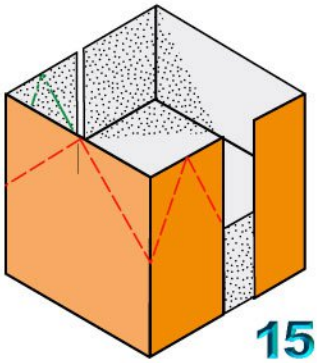
13

Ripiegando e comprimendo contemporaneamente, aprite modellando 3D

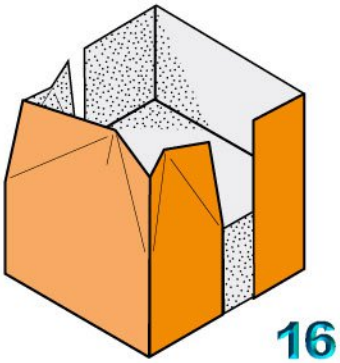


14

Ribaltate

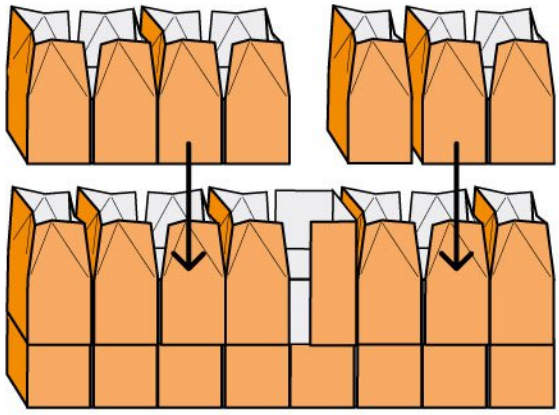


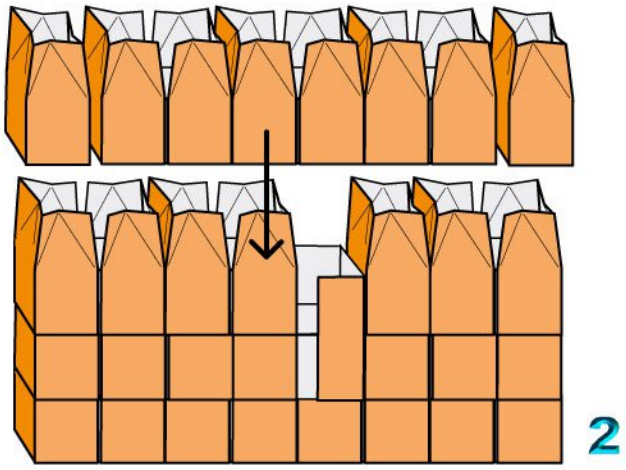
6 pieghe a valle per restringere il bordo del perimetro superiore di una parte del blocco

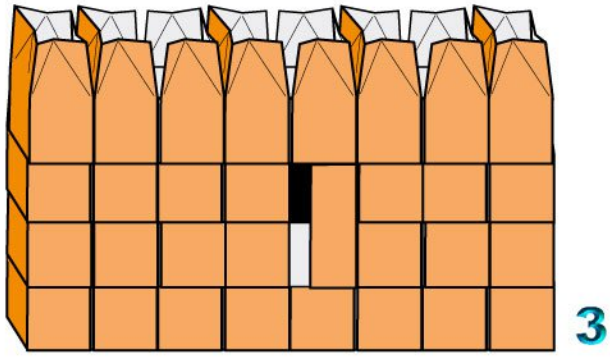


Blocco per feritoia ultimato

Costruzione di muratura con feritoia: si deve lasciare uno spazio pari ad un semiblocco superiormente alla feritoia per non occluderla





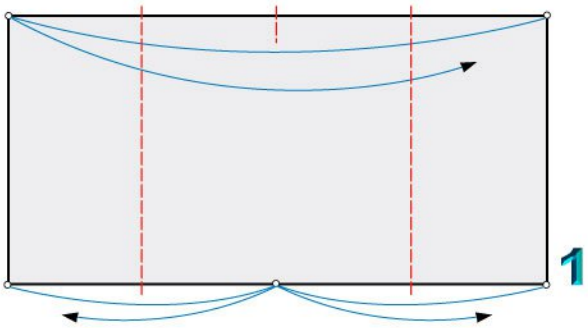


ESEMPIO DI MURATURA CON FERITOIA

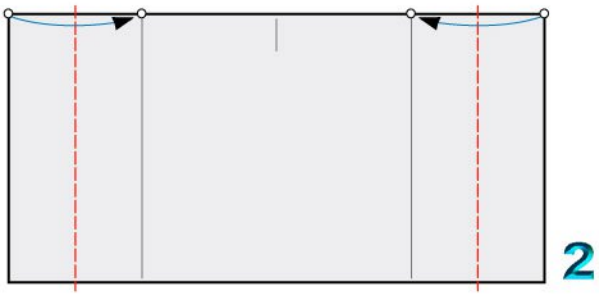
BERTESCA

Struttura costituita da un'impalcatura lignea a sbalzo posta alla sommità di un muro di cinta o appesa a protezione di una parte esposta o di un accesso, dotata di piombatoie. A volte veniva montata in previsione di un assedio e veniva resa ignifuga con pelli bagnate fissate alla struttura. In un periodo successivo molte bertesche vennero costruite in laterizio. Di costruzione elaborata, si realizza con 2 fogli rettangolari,1 per la base ed 1 per la copertura.

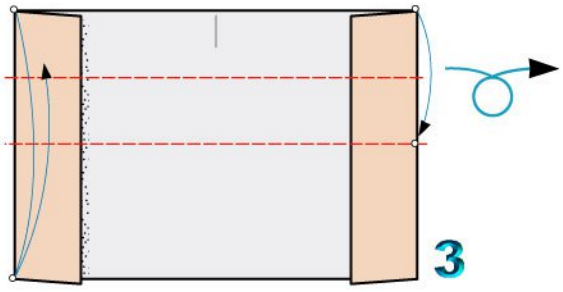
COSTRUZIONE DELLA BASE



Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 trasversali



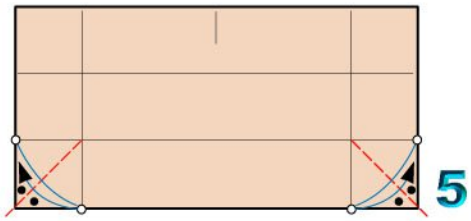
2 pieghe a valle e ruotate



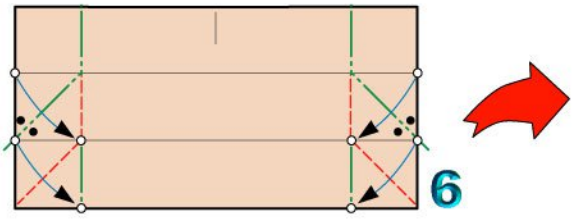
2 pieghe a valle, ruotate e ribaltate



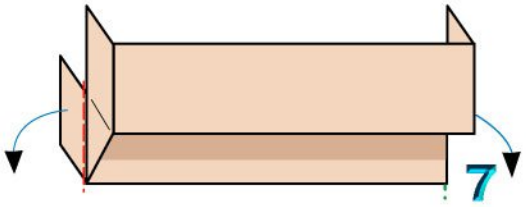
1 piega a valle e ruotate



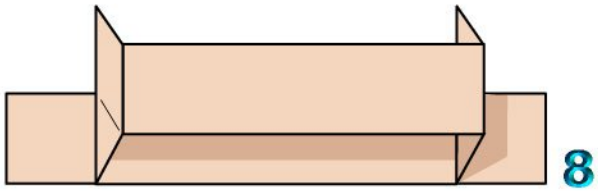
2 pieghe bisettrici a valle



2 pieghe bisettrici a monte e ripiegando a valle ed a monte modellate 3D

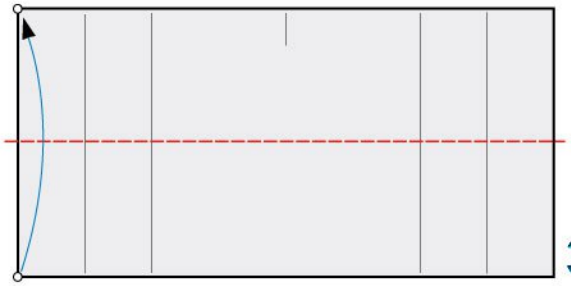


2 pieghe a valle e ruotate le appendici laterali



base di bertesca ultimata

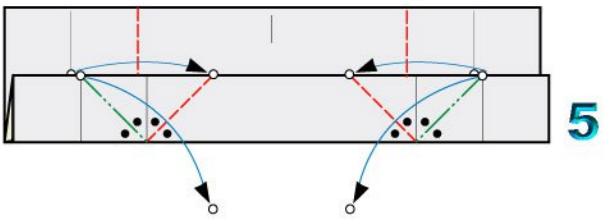
COSTRUZIONE DELLA COPERTURA



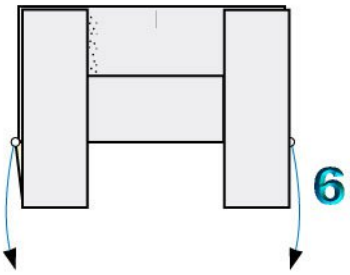
Partite dalla fig. n. 2 della base di bertesca,1 piega a valle e ruotate



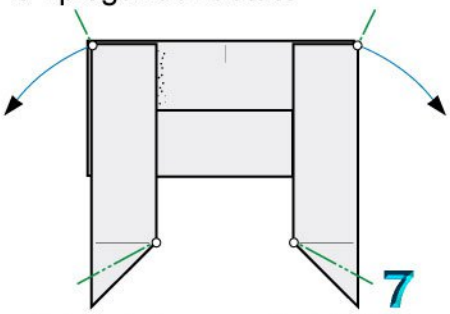
1 piega a valle solo sulla superficie in vista e ruotate



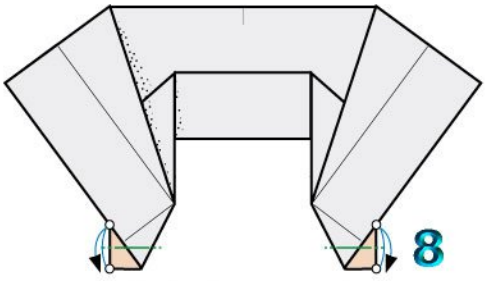
2 pieghe a valle, 2 a monte, e ripiegando ruotate



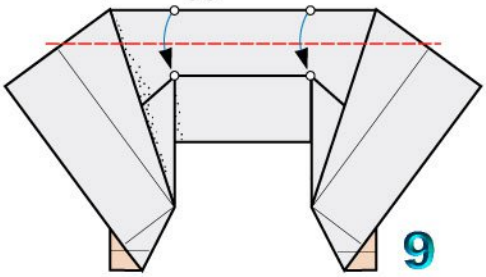
Estraete i vertici indicati



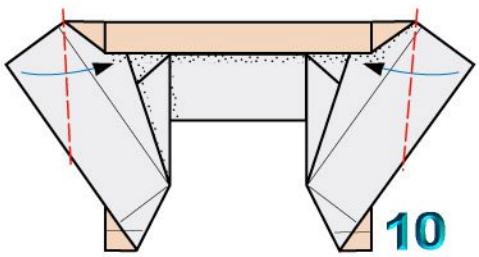
Estraete le superfici visibili nel passaggio successivo



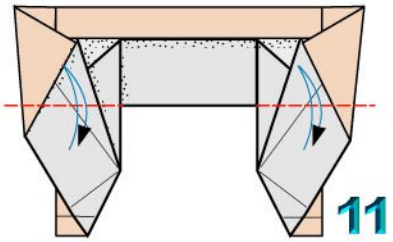
2 pieghe a monte



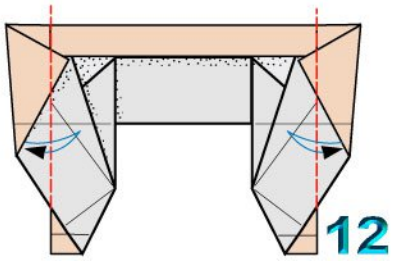
1 piega a valle e ruotate



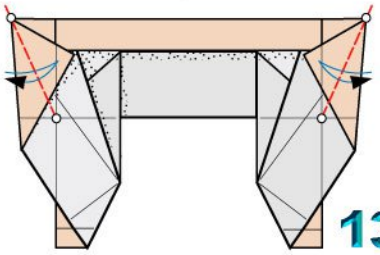
2 pieghe a valle e ruotate



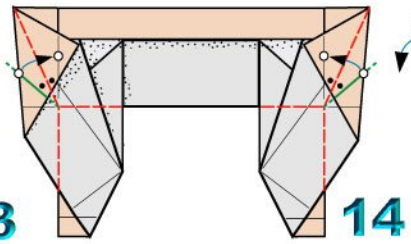
2 pieghe a valle



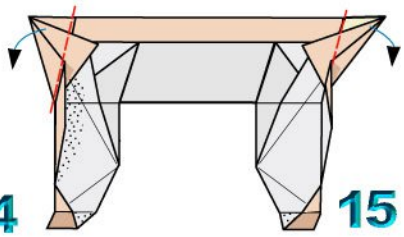
2 pieghe a valle



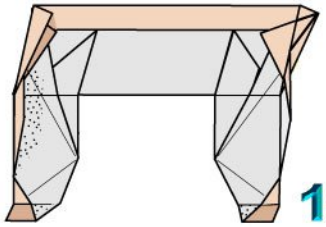
2 pieghe a valle



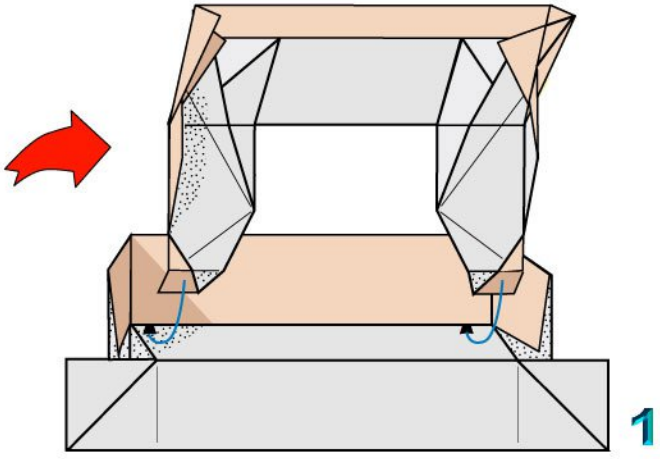
2 pieghe bisettrici a monte e, ripiegando a valle, ruotate 3D



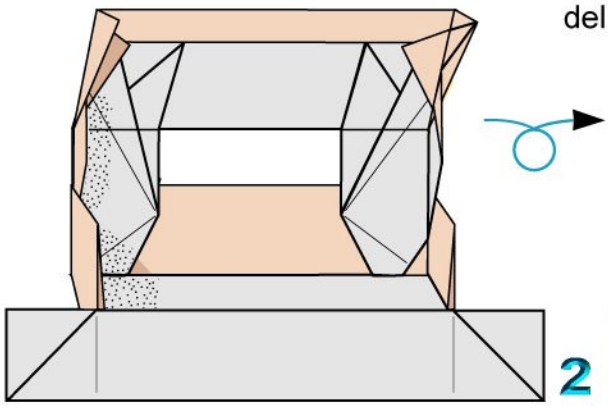
2 pieghe a valle e ruotate



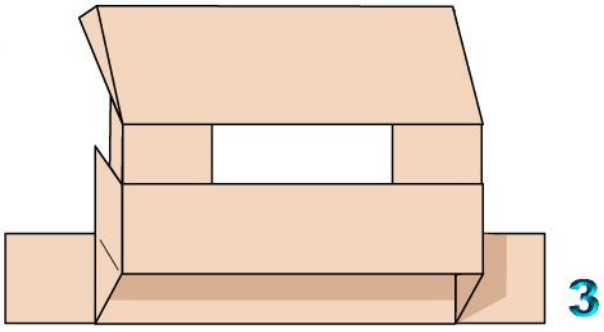
Copertura di bertesca ultimata



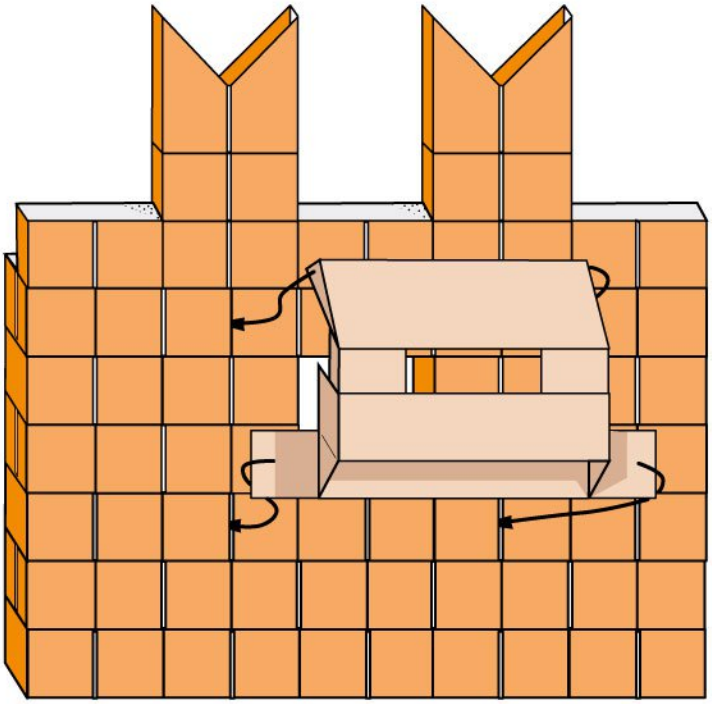
Montaggio di bertesca: intascate i bordi inferiori della copertura nella tasca della base indicata



Ribaltate

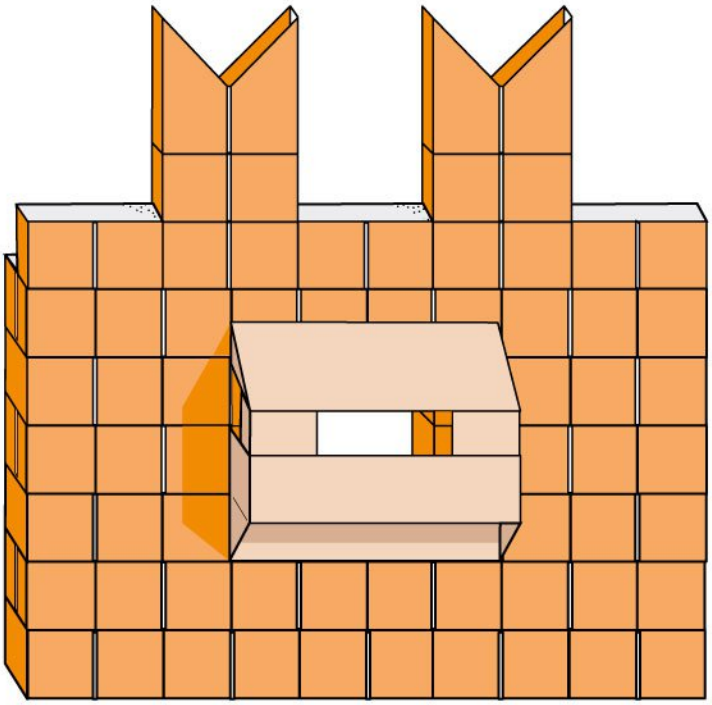


Bertesca ultimata



Montaggio della bertesca sulla parete: inserite le sue appendici laterali nelle fessure centrali di 2 blocchi A

4



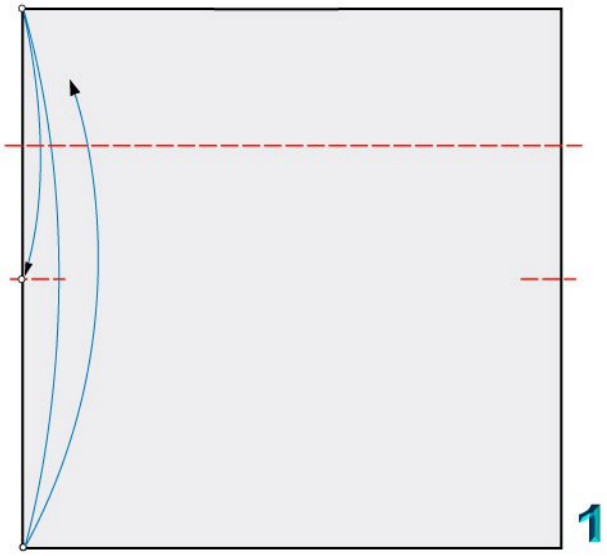
BERTESCA ULTIMATA

5

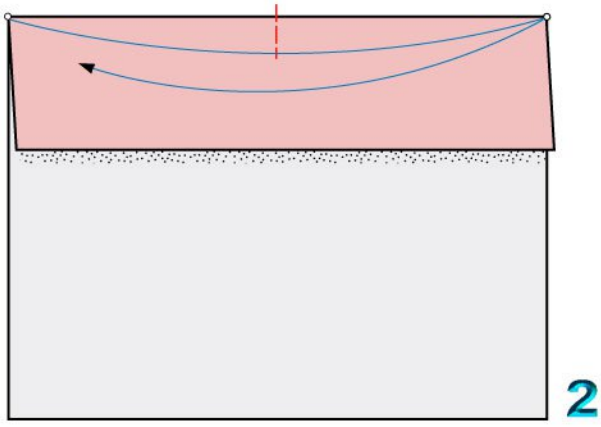
MASTIO

Torre di un castello caratterizzata da un'altezza e da una robustezza superiore alle altre, con un accesso protetto e spesso sopraelevato, adoperata come ultima risorsa difensiva.
Sono necessari 4 fogli quadrati per costruirne la copertura, che si appoggia su 4 pilastri ricavati da moduli A modificati.

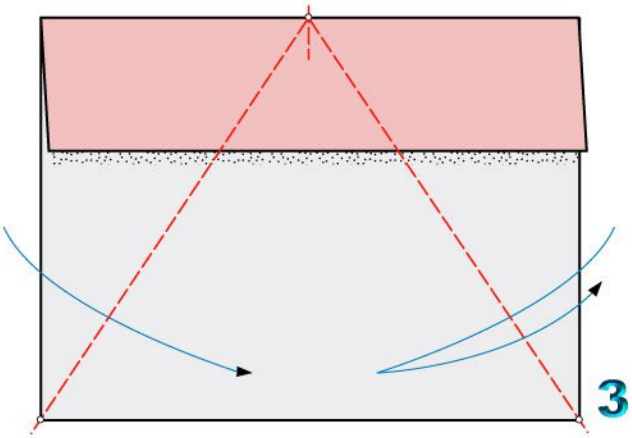
COSTRUZIONE DELLA COPERTURA



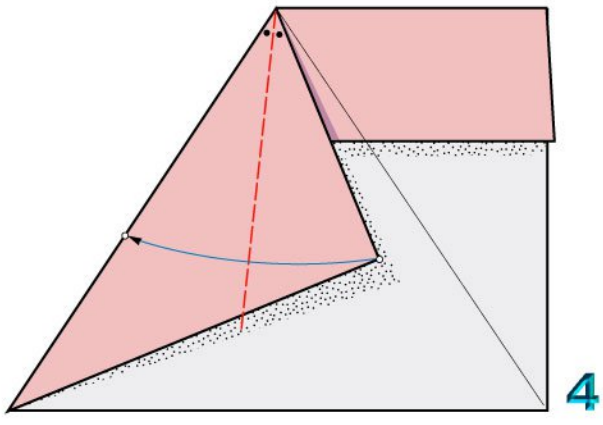
3 pieghe a valle, 2 piccole e ruotate



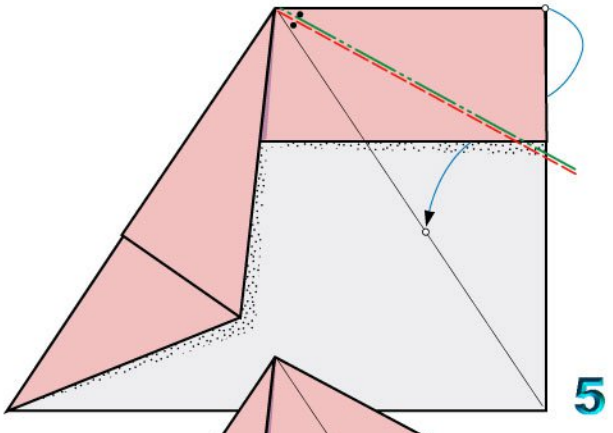
1 piccola piega a valle



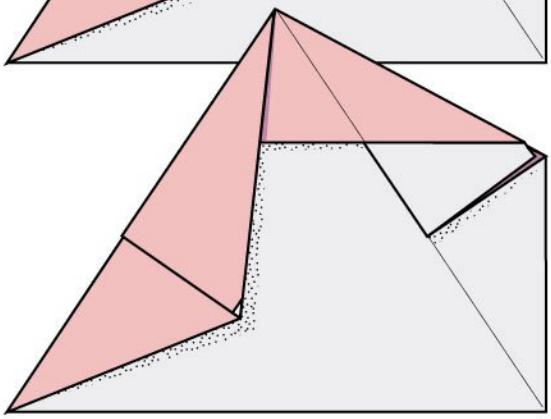
2 pieghe a valle, e ruotate la superficie sinistra



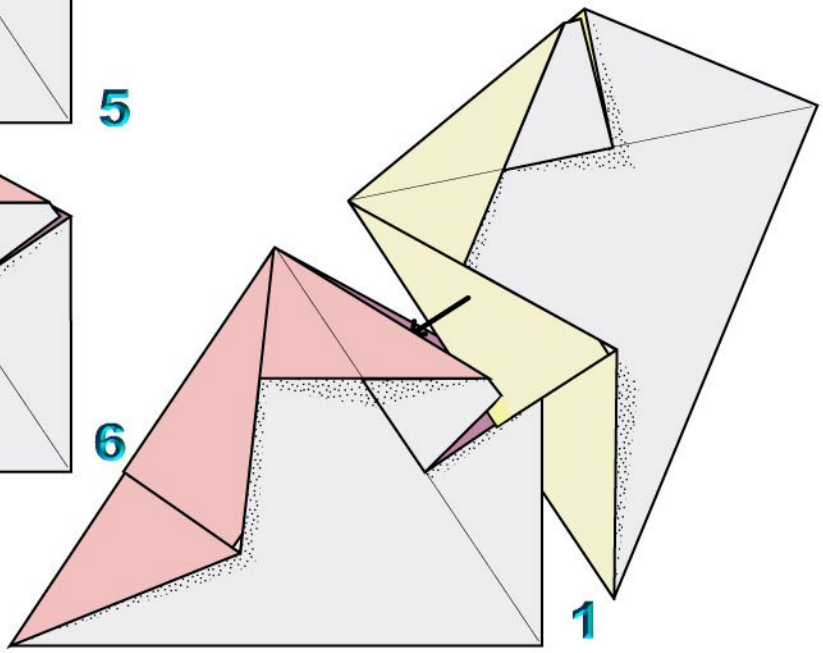
1 piega bisettrice a valle e ruotate



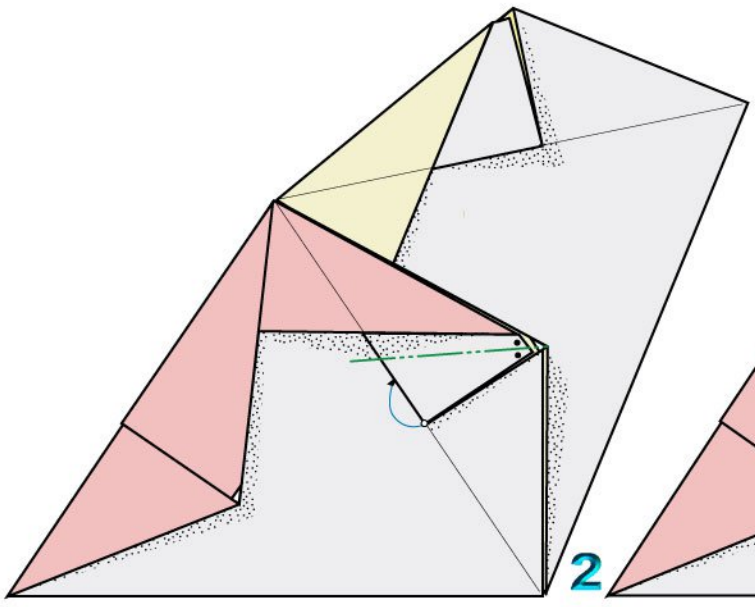
Eseguite 1 piega rovescia interna



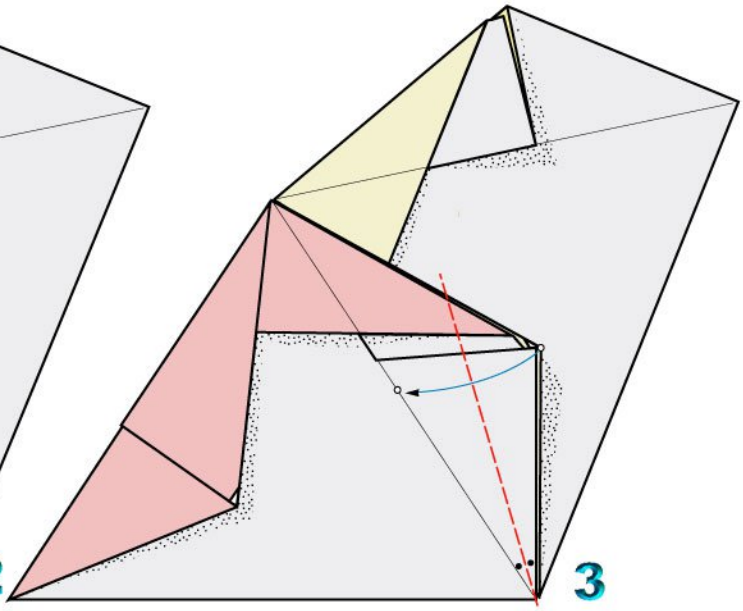
Modulo ultimato



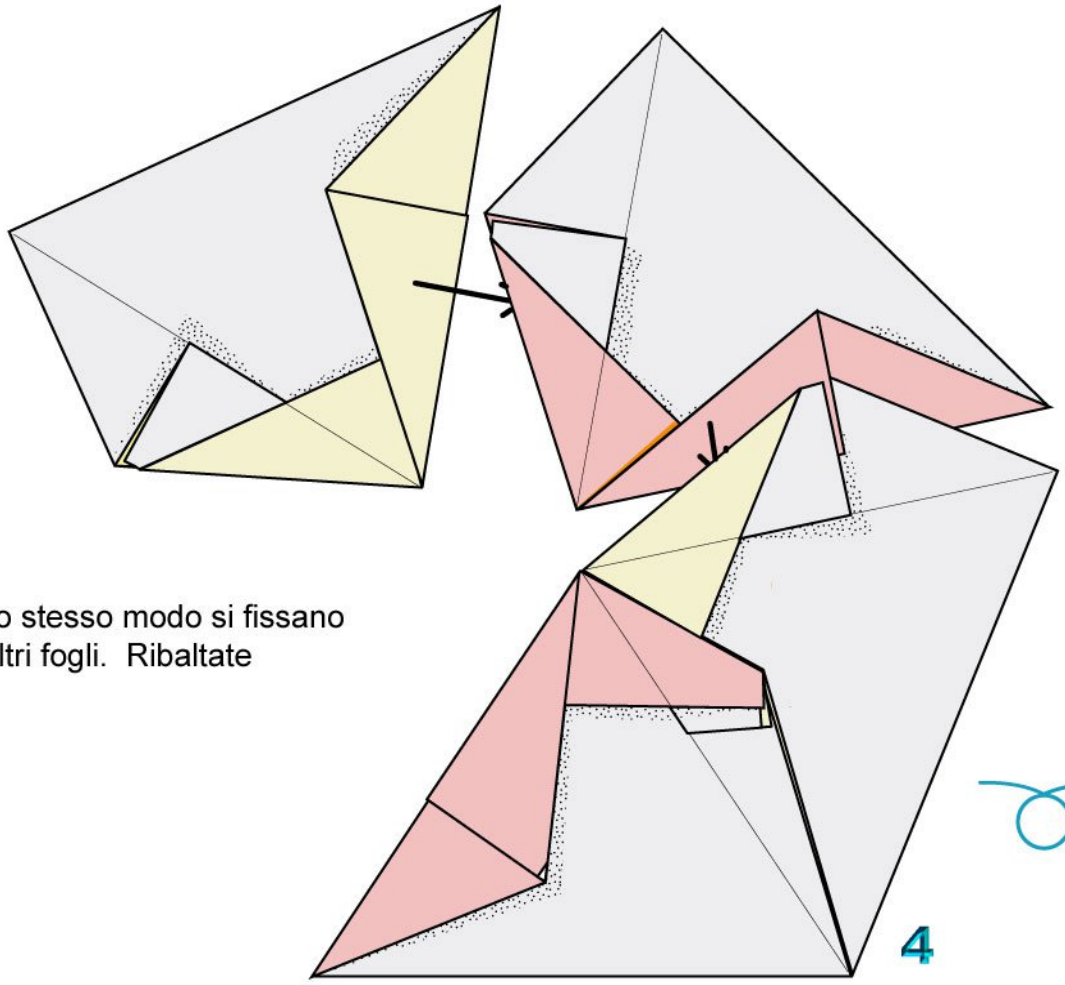
Unione di due moduli: inserite l'aletta di uno entro la tasca di un'altro



1 piega bisettrice a monte e
ruotate per bloccare l'unione

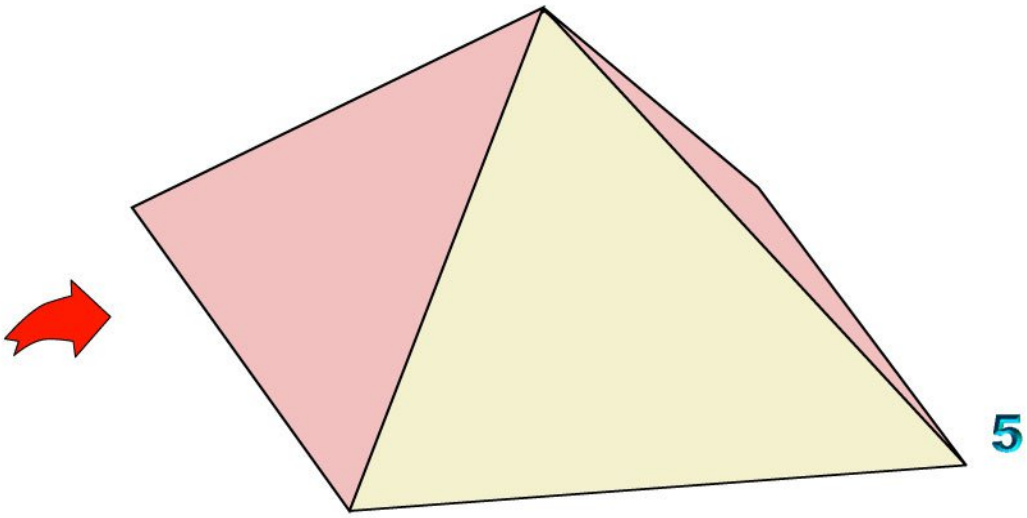


1 piega bisettrice a valle e
ruotate bloccando l'unione



Nello stesso modo si fissano
gli altri fogli. Ribaltate

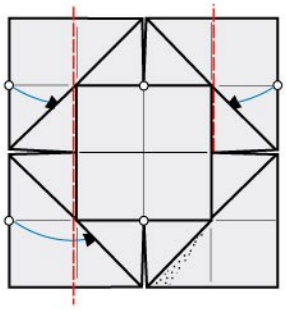
4



5

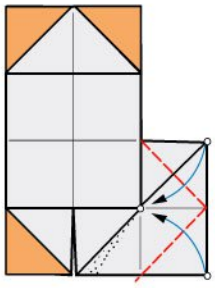
COPERTURA DI MASTIO ULTIMATA

COSTRUZIONE DEI PILASTRI D'APPOGGIO DELLA COPERTURA



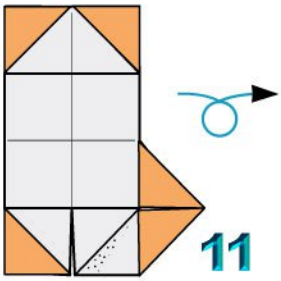
9

Partite dalla fig. n. 8 del modulo A4. 3 pieghe a valle e ruotate intascando



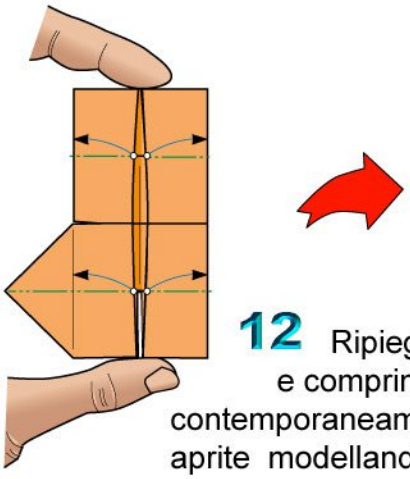
10

2 pieghe a valle e ruotate

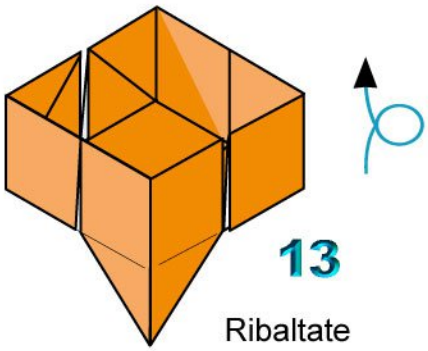


11

Ribaltate

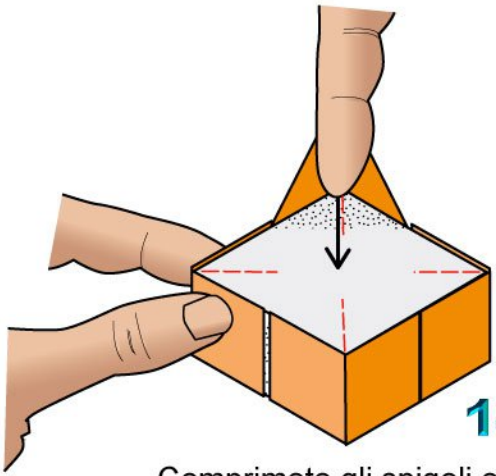


12 Ripiegando e comprimendo contemporaneamente, aprite modellando 3D



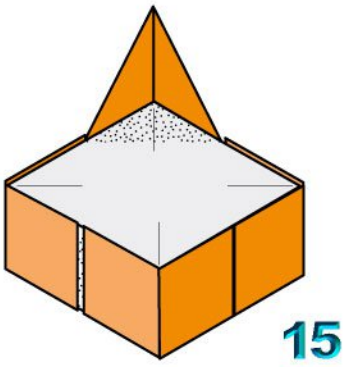
13

Ribaltate



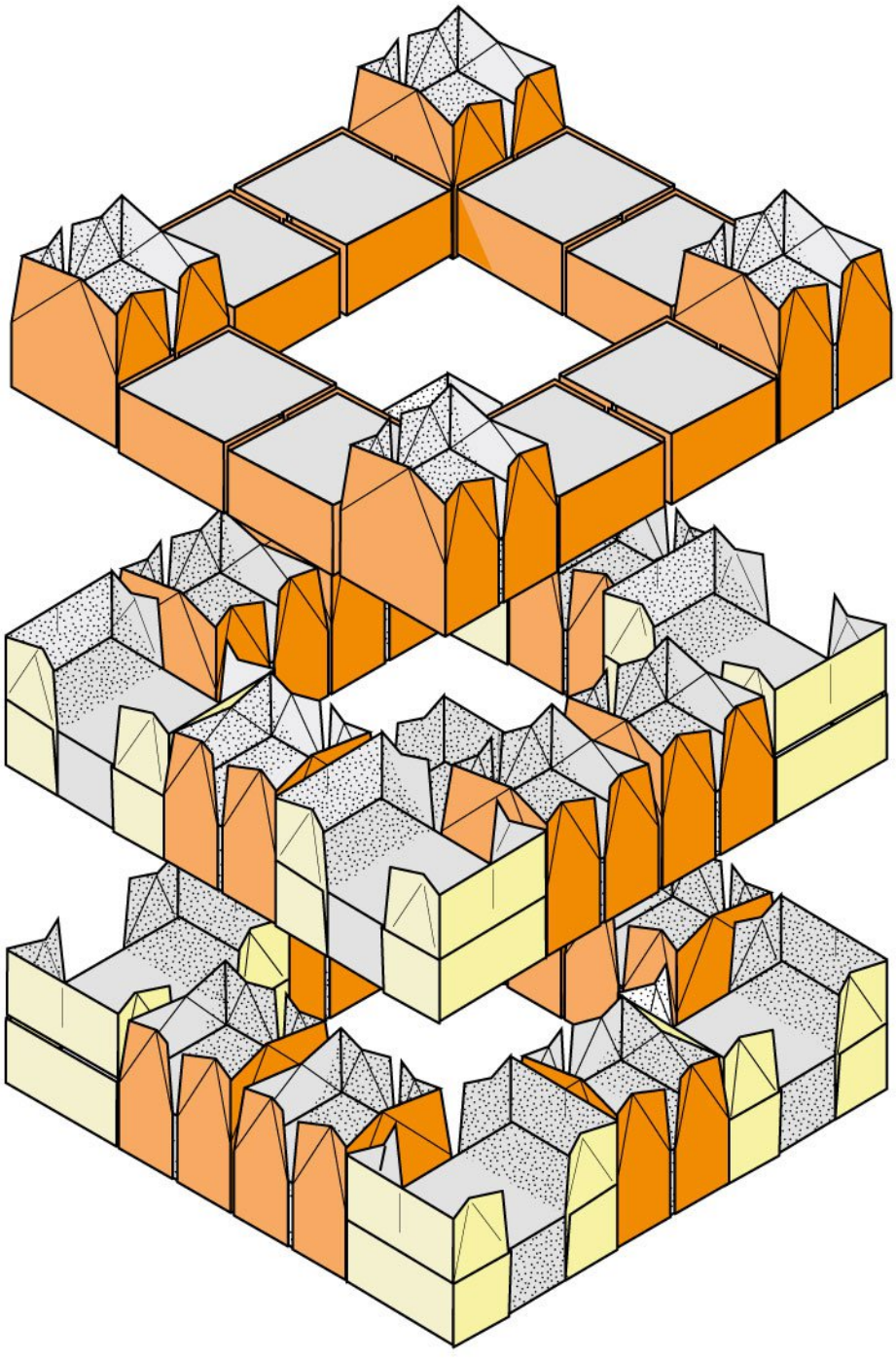
14

Comprimete gli spigoli e fate rientrare leggermente il fondo

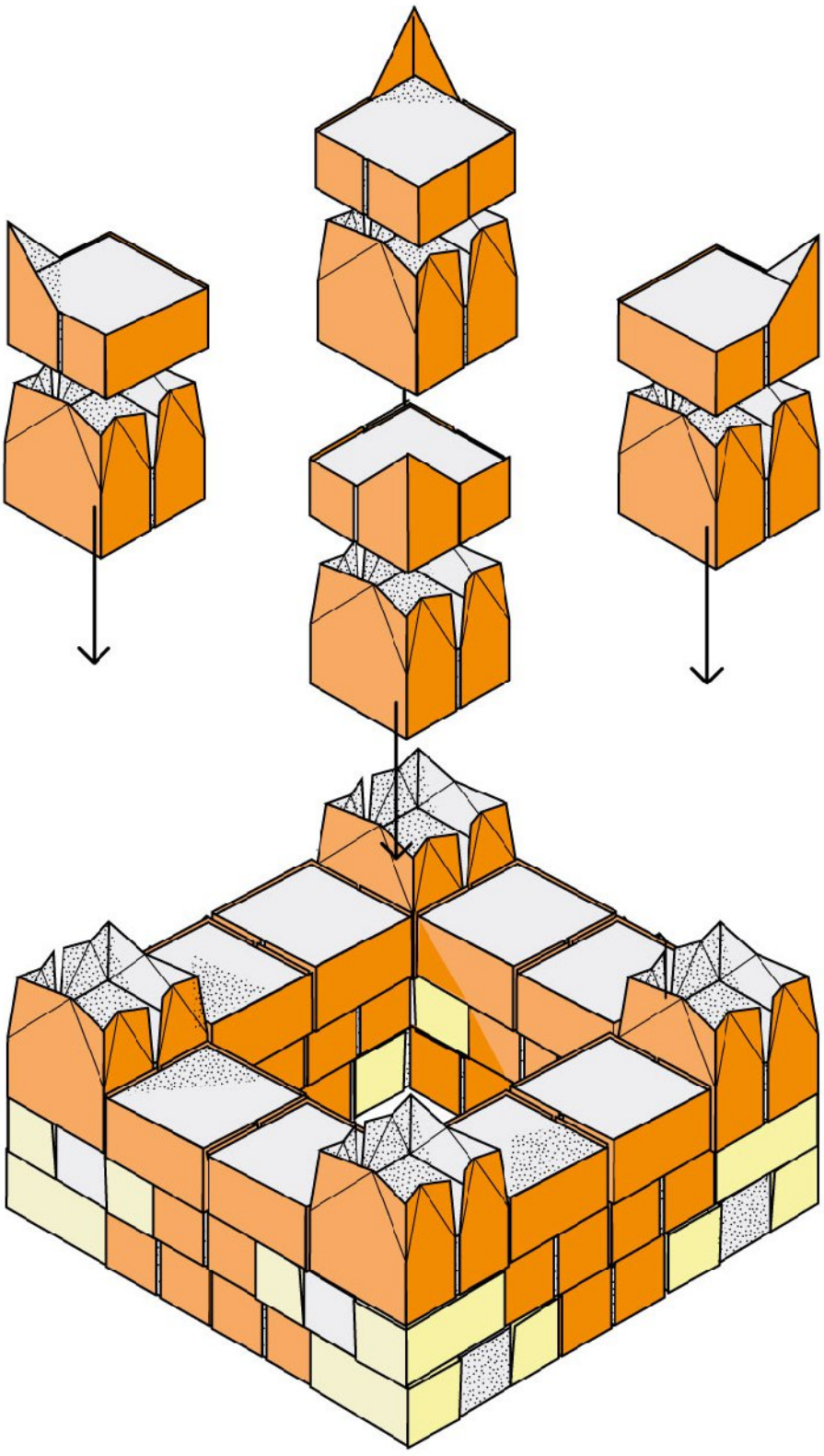


15

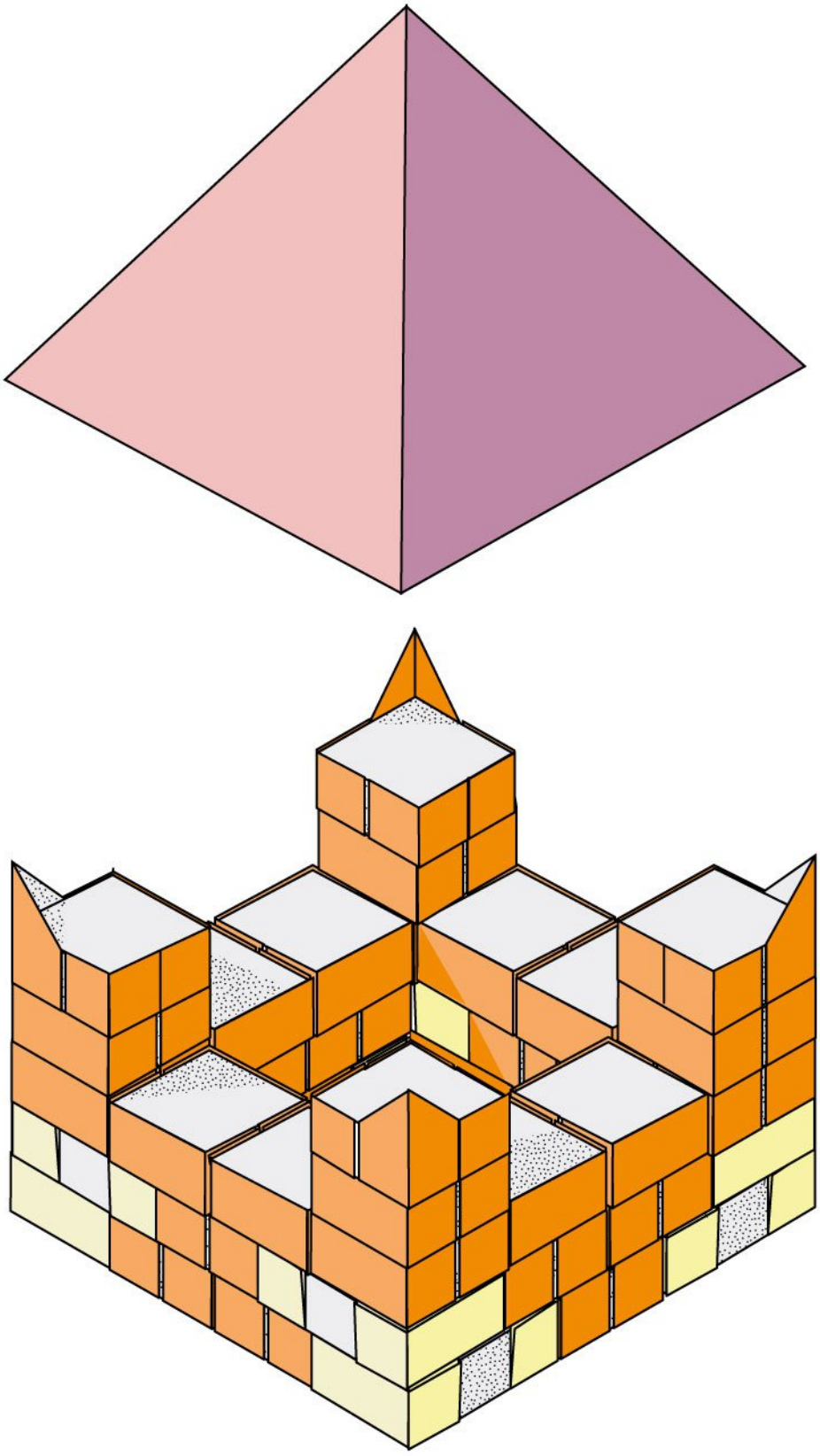
Pilastro d'appoggio della copertura ultimato



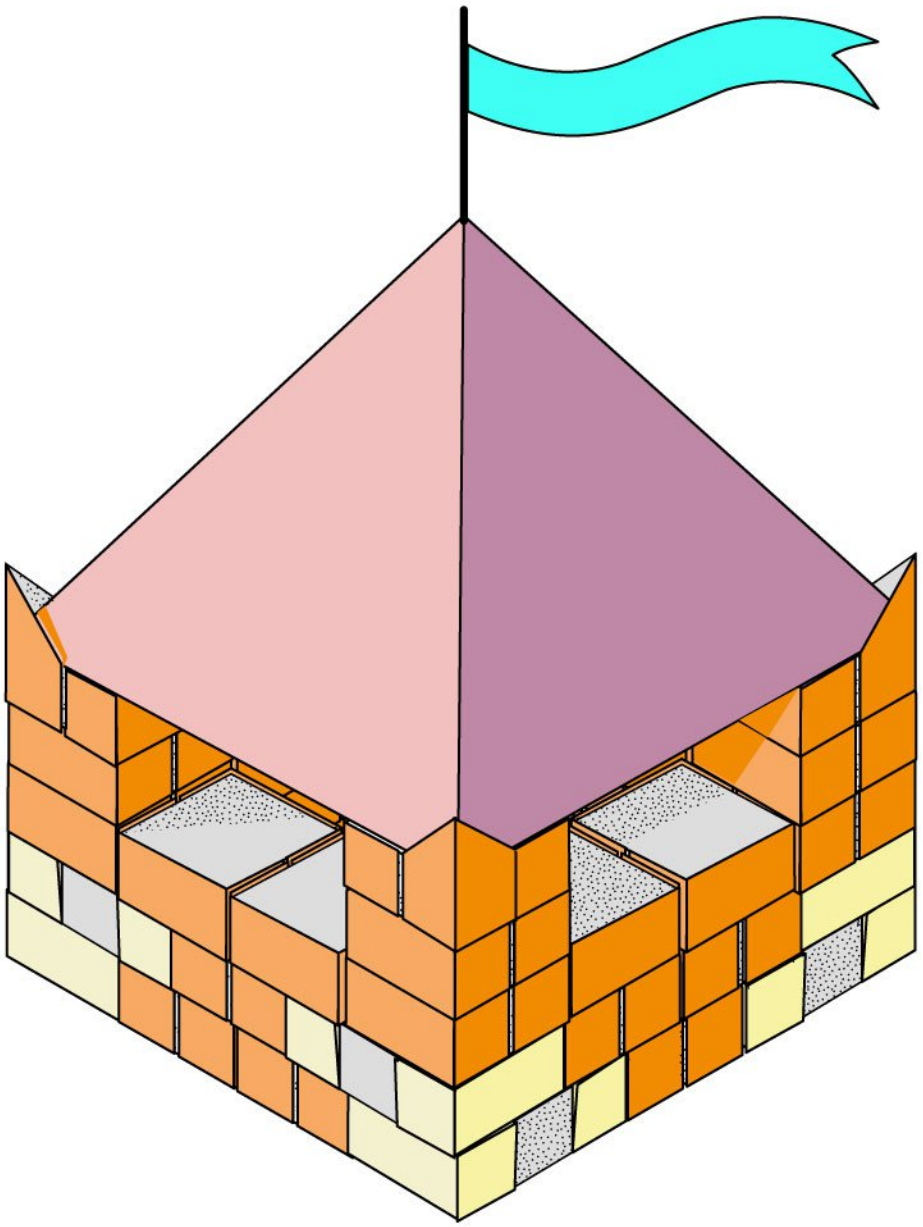
Costruzione della torre



Montaggio dei pilastri d'appoggio della copertura



Montaggio della copertura sui pilastri d’appoggio

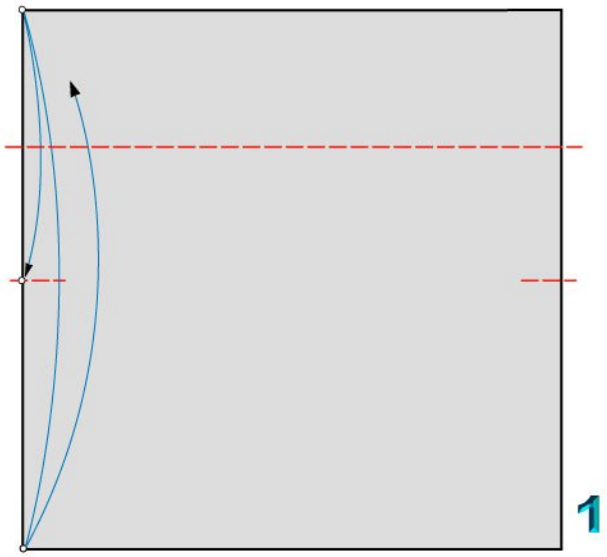


MASTIO COMPLETATO

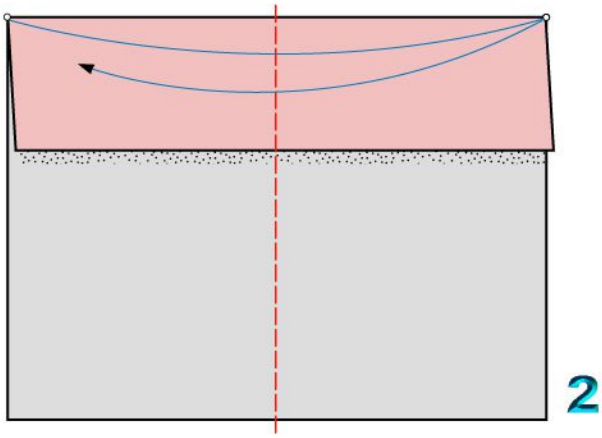
CAMPANILE

Sono necessari 2 fogli quadrati per costruirne la copertura, che si appoggia su 4 pilastri ricavati da moduli B modificati.

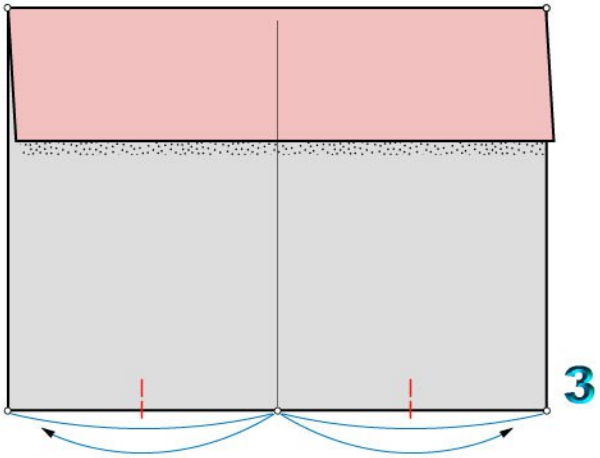
COSTRUZIONE DELLA COPERTURA



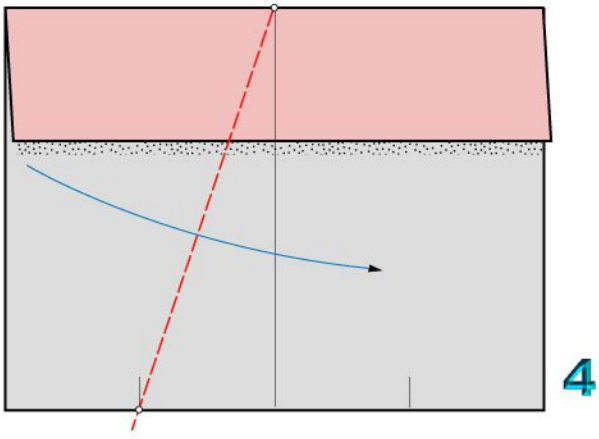
3 pieghe a valle, 2 piccole e ruotate



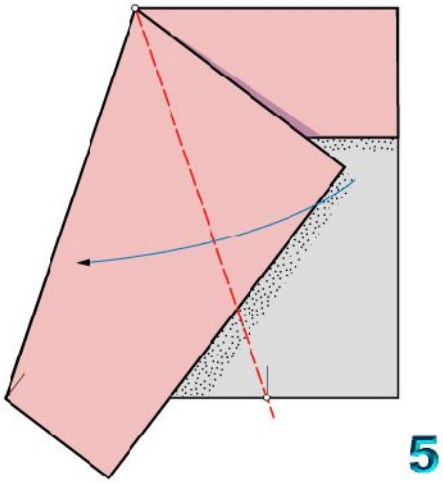
1 piega a valle



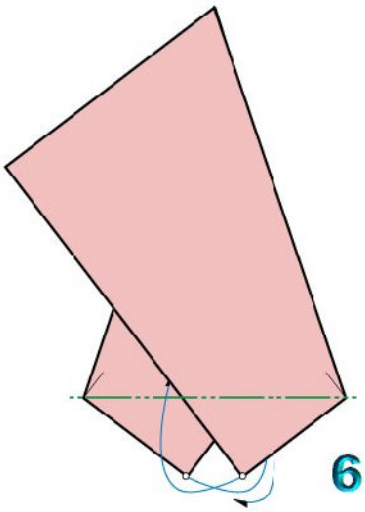
2 piccole pieghe a valle



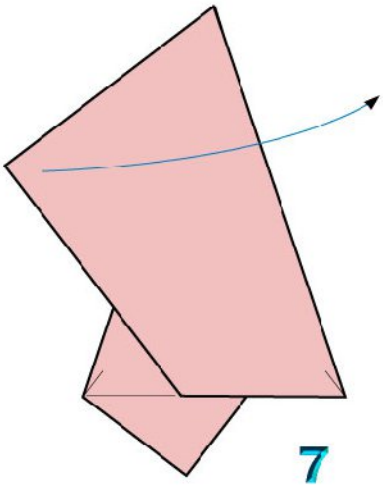
1 piega a valle e ruotate



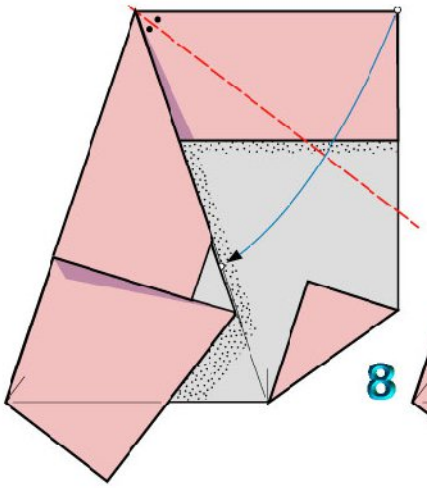
1 piega a valle e ruotate



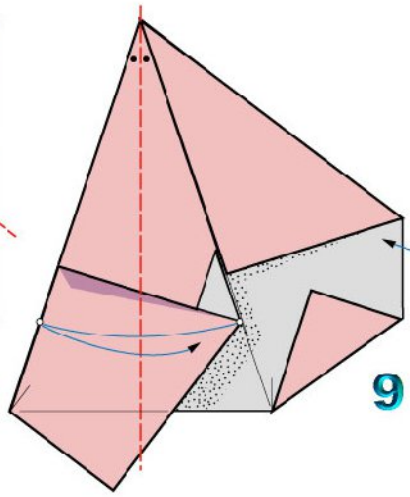
1 piega a monte e ruotate il vertice destro



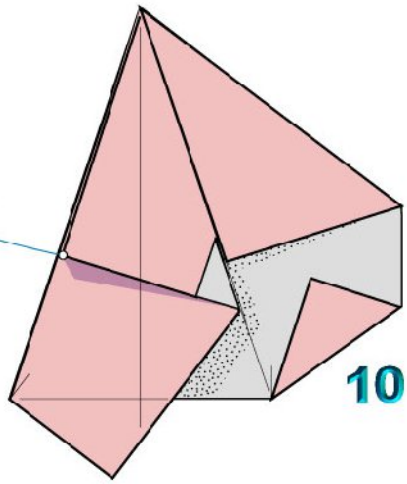
Aprite



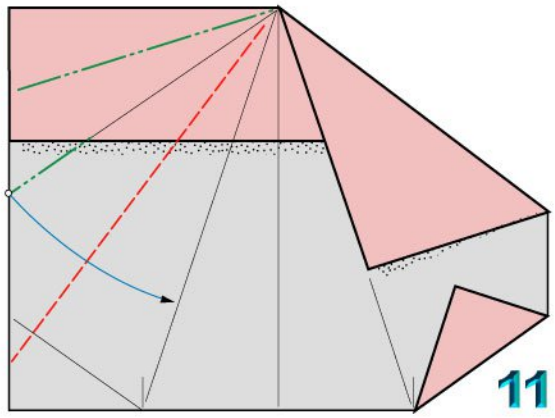
1 piega bisettrice a valle e ruotate



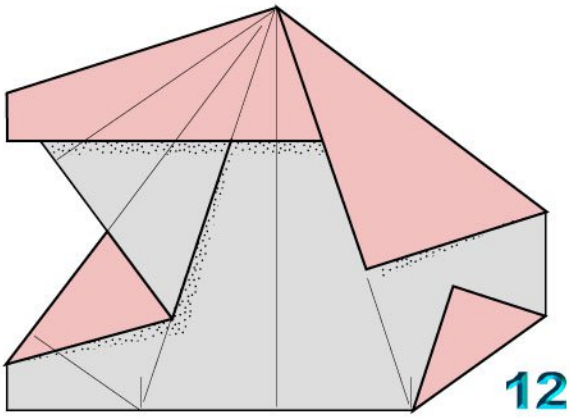
1 piega bisettrice a valle



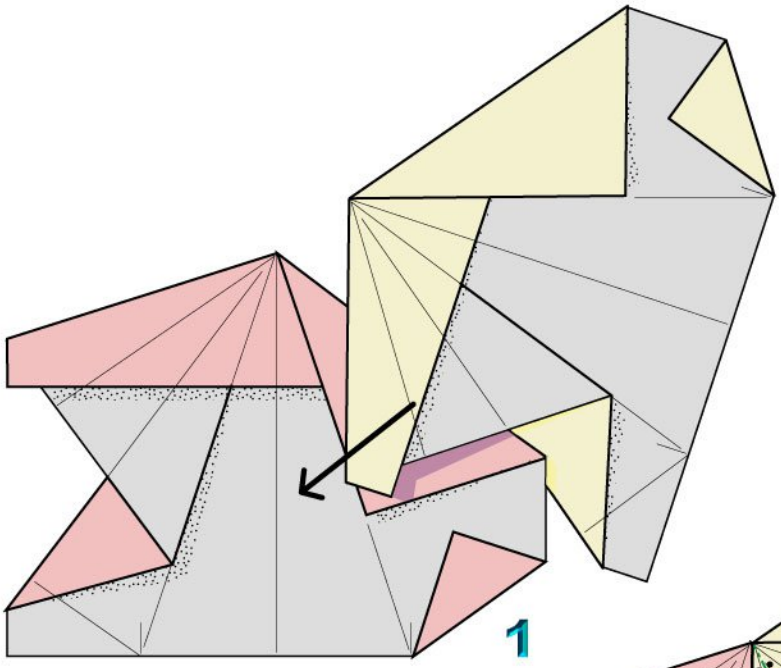
Aprite



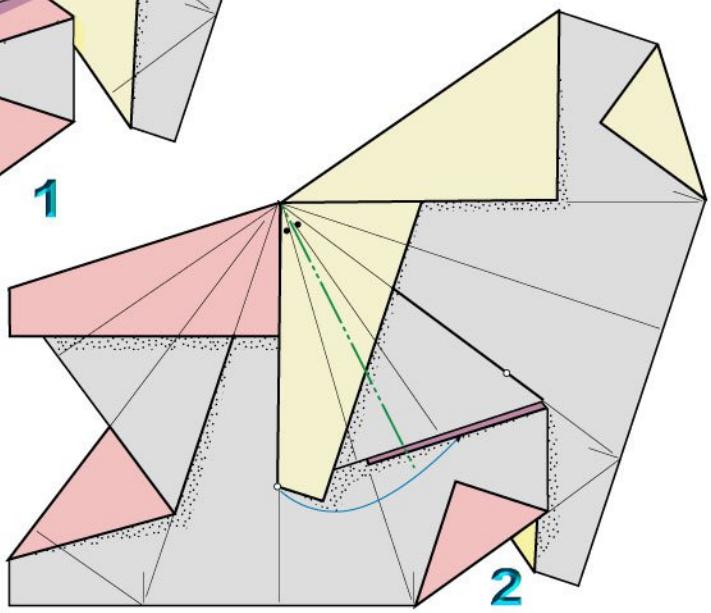
Ruotate ripiegando a valle ed a monte



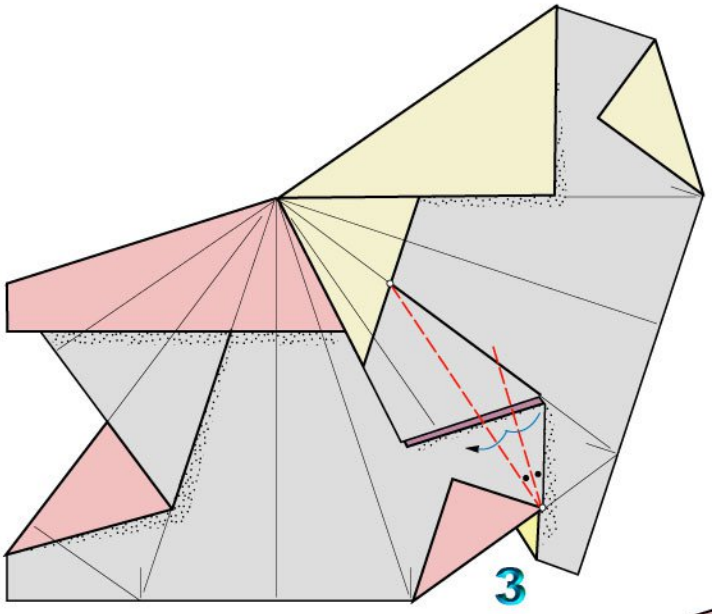
Modulo ultimato



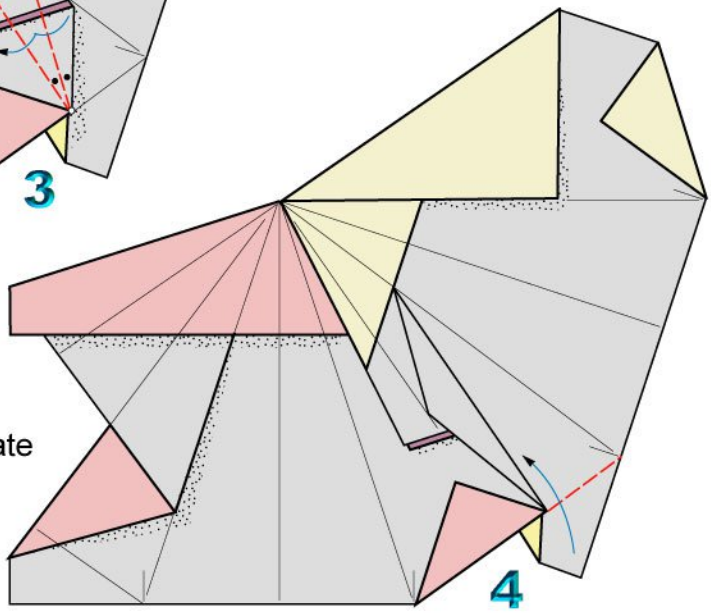
Montaggio dei 2 moduli:
inserite un modulo nell'altro



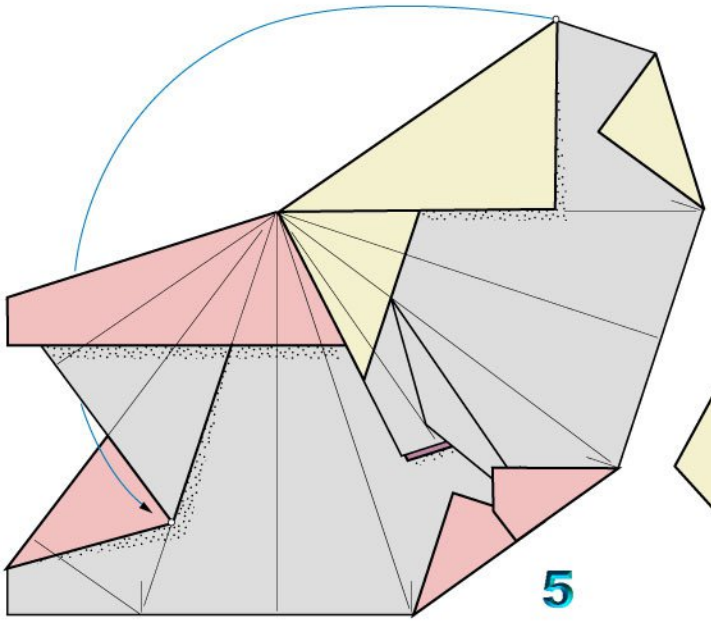
1 piega bisettrice a monte e ruotate

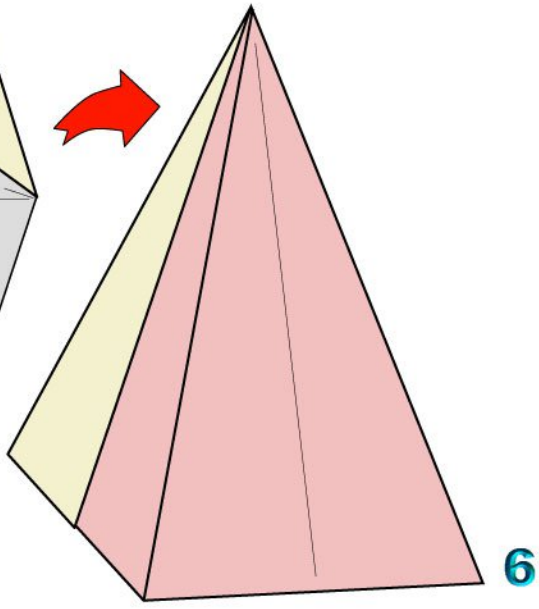


2 pieghe a valle e ruotate per bloccare il tutto



1 piega a valle e ruotate





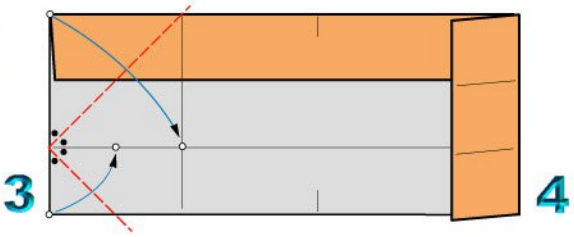
Ripetete l'operazione per chiudere la piramide

Copertura ultimata

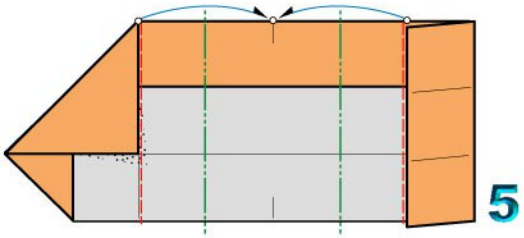
COSTRUZIONE DEI PILASTRI D'APPOGGIO DELLA COPERTURA



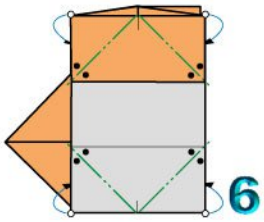
Partite dalla fig.n.2 del semiblocco B.
1 piega a valle e ruotate



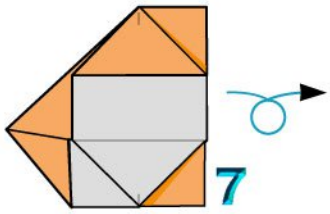
2 pieghe bisettrici a valle e ruotate



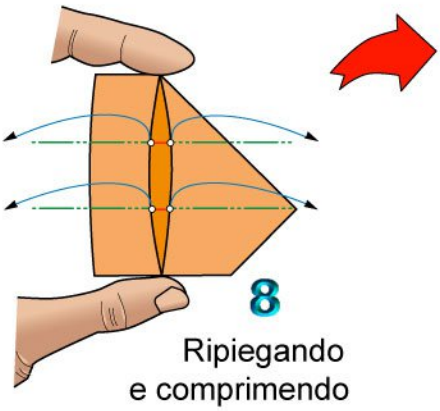
2 pieghe a monte e ruotate
ripiegando a valle



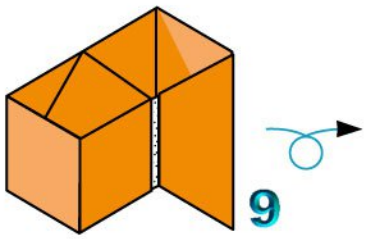
4 pieghe bisettrici a
monte e ruotate all'interno



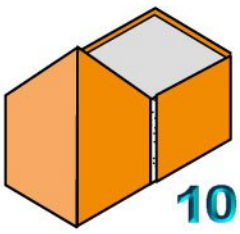
Ribaltate



Ripiegando
e comprimendo
contemporaneamente,
aprite modellando 3D

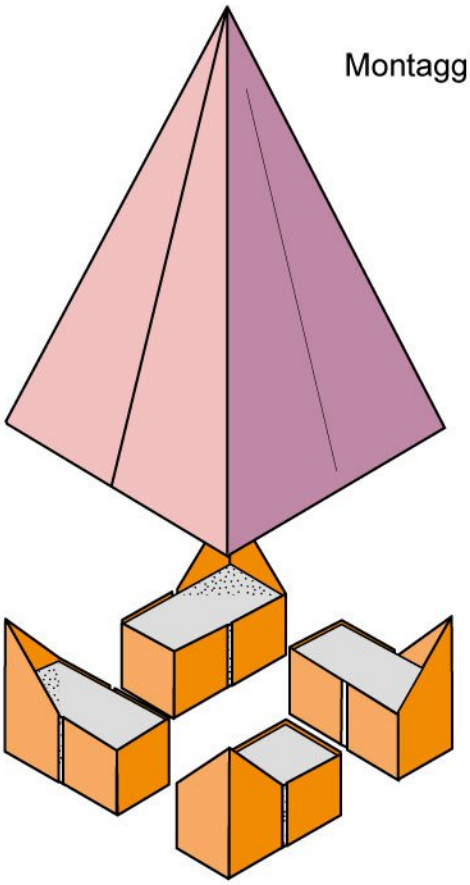


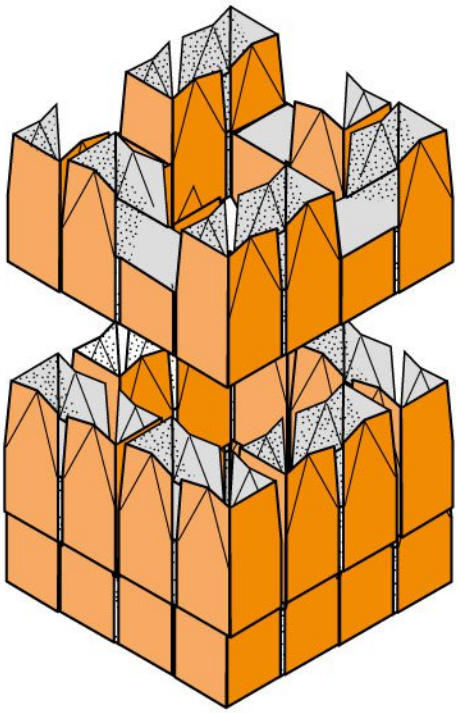
Ribaltate

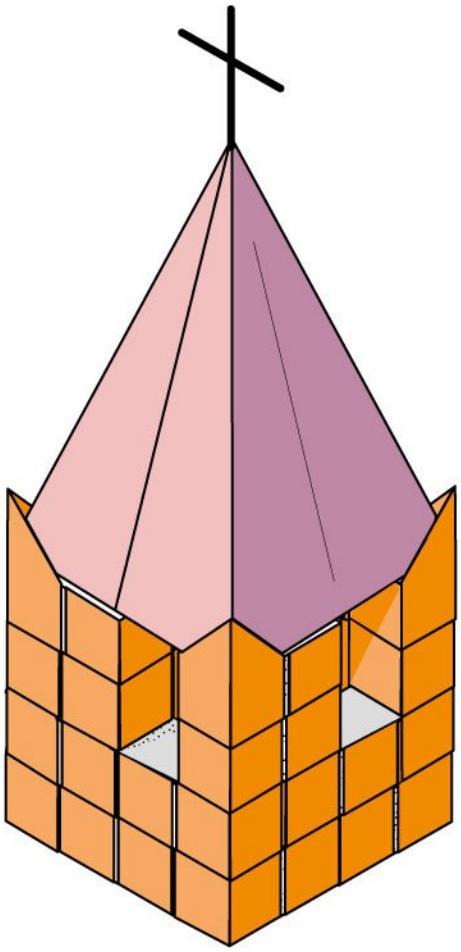


Pilastro d'appoggio
ultimato

Montaggio del campanile







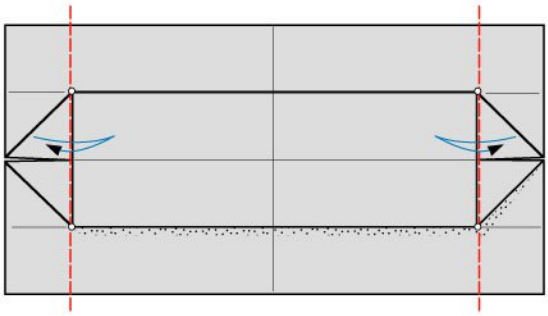
CAMPANILE ULTIMATO

PROTIRO

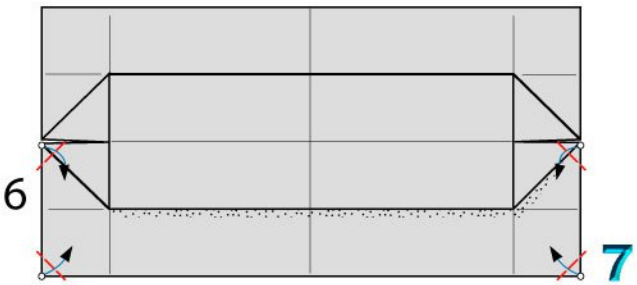
È un piccolo portico, con copertura a cuspide, posto a protezione dell'ingresso principale di una chiesa medioevale, sostenuto da setti murari o colonne stilofore.

Si realizza appoggiando un tetto a 2 setti murari

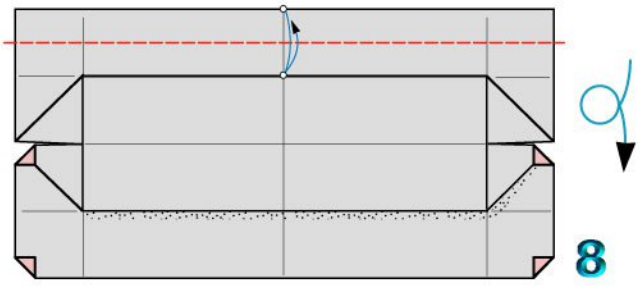
COSTRUZIONE DEL TETTO



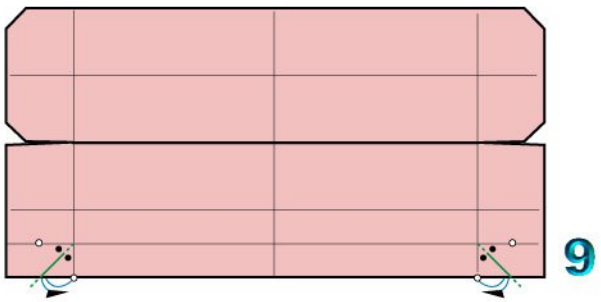
Partite dalla fig. n. 5 del blocco A4.
2 pieghe a valle



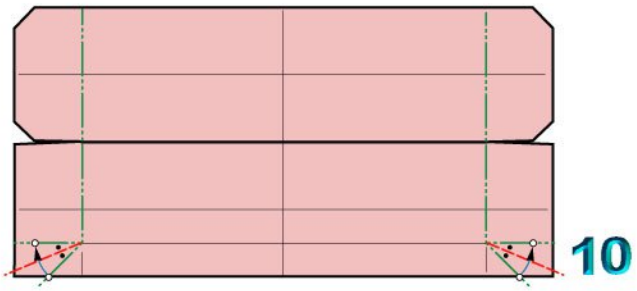
4 piccole pieghe a valle e ruotate



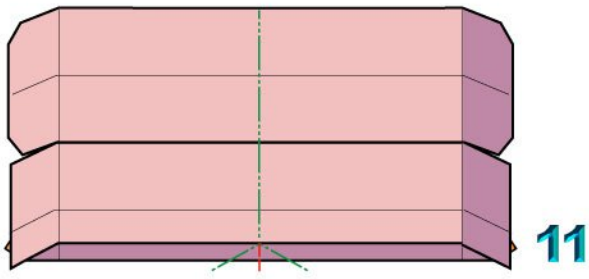
1 piega a valle e ribaltate



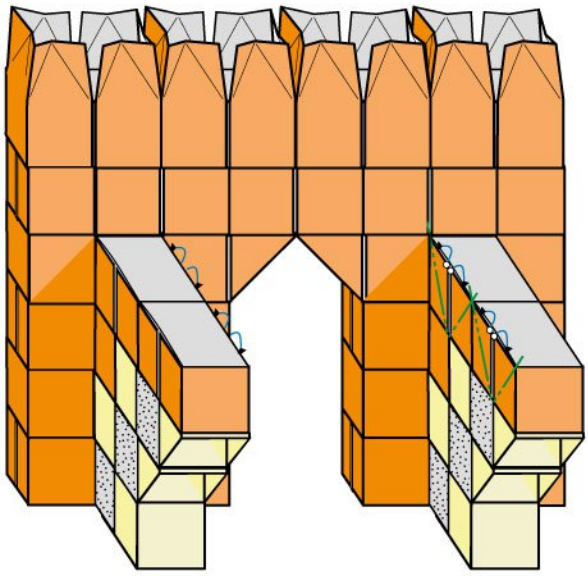
2 pieghe bisettrici a monte



2 pieghe bisettrici a valle e, ripiegando a monte, ruotate 3D



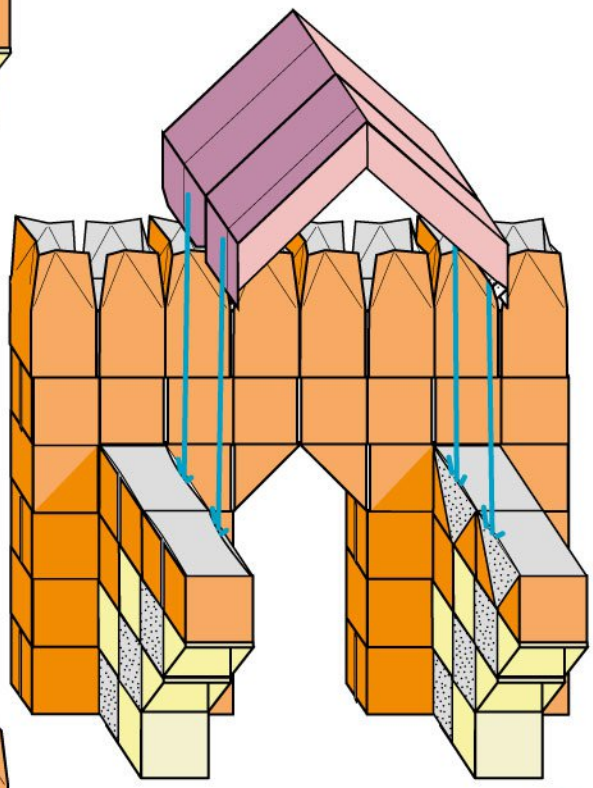
2 pieghe bisettrici a monte sullo spessore e modellate il tetto 3D



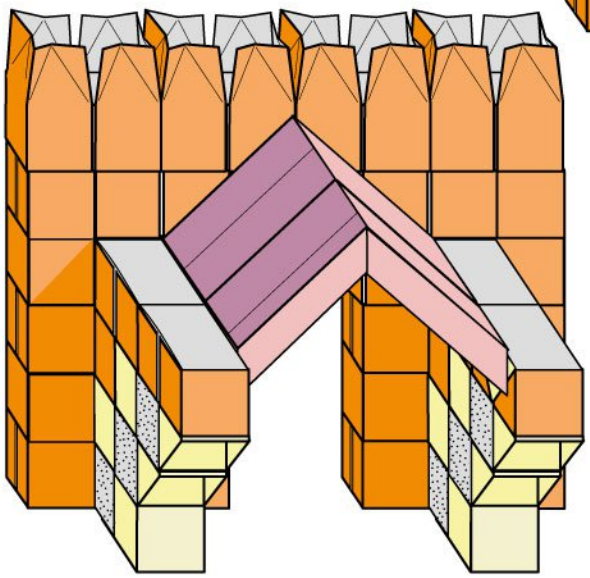
12

Realizzazione delle 2 spalle con blocchi B3, B1 e B2.
Eseguite 8 pieghe a monte e piegate all'interno i vertici indicati dei 4 semiblocchi B2

Montate il tetto inserendone la base nelle tasche dei blocchi B2



13



14

Protiro ultimato

TETTO

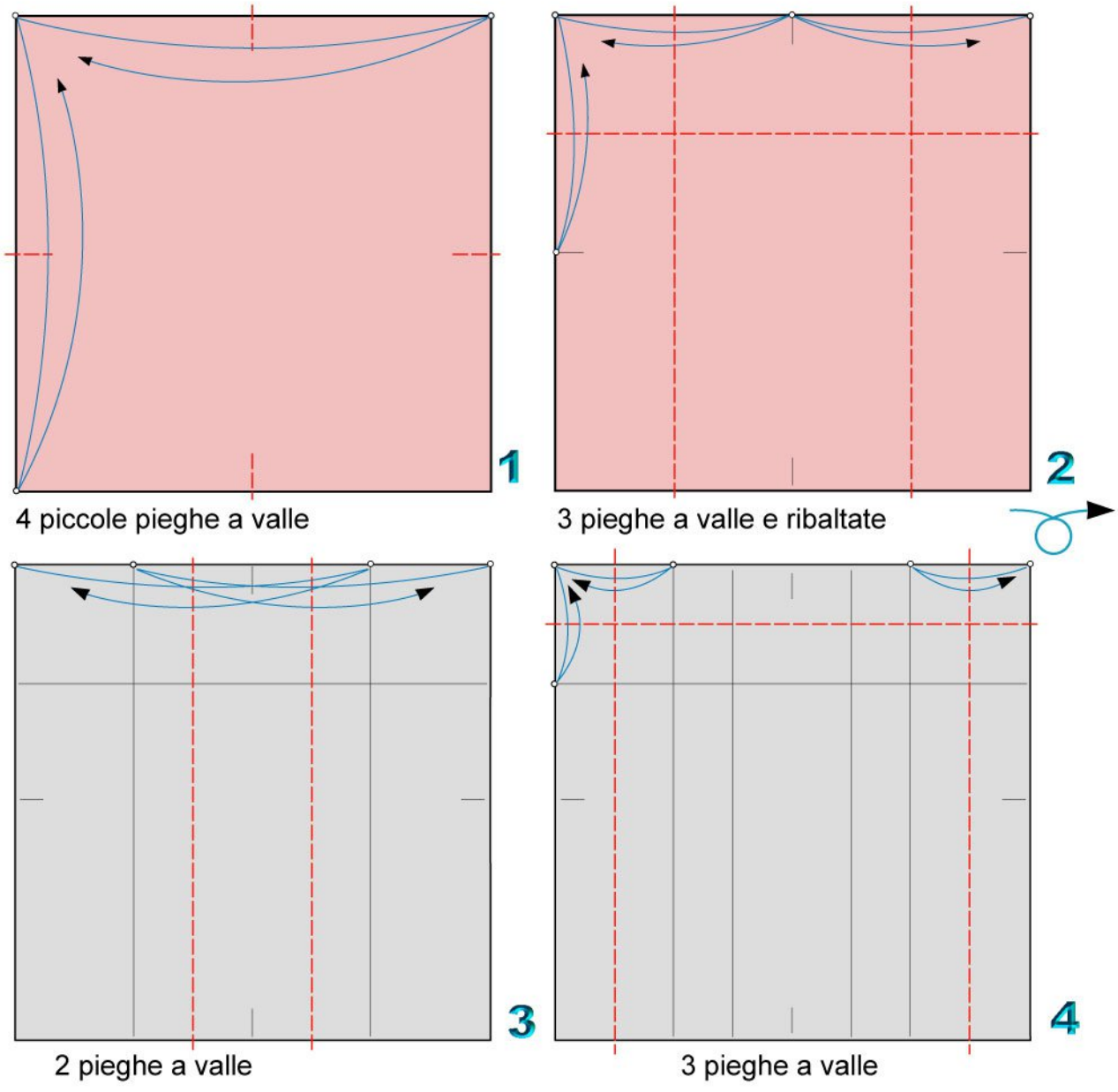
La costruzione di una grande struttura orizzontale adoperando i soliti fogli piccoli presuppone la necessità di ricavare un paio di nervature di irrigidimento su ogni foglietto, e di un sistema di bloccaggio robusto.

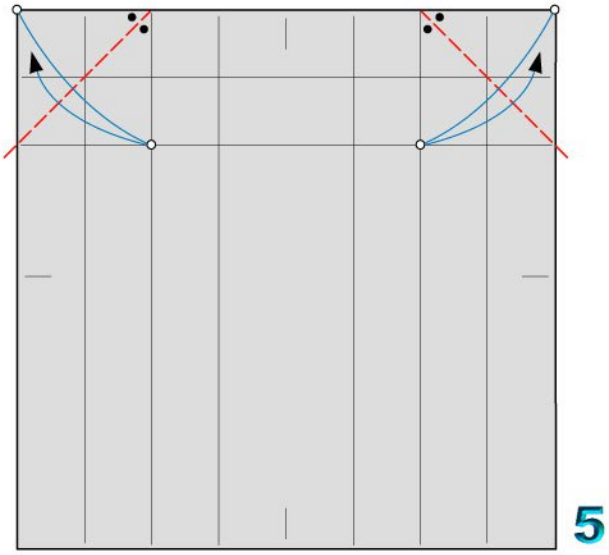
Le nervature comunque ben rappresentano esteticamente le travi di un solaio di legno.

Il tetto che quì si realizza ha una pendenza di 45°.

Un grande solaio o tetto si realizza affiancando più pannelli formati da più moduli.

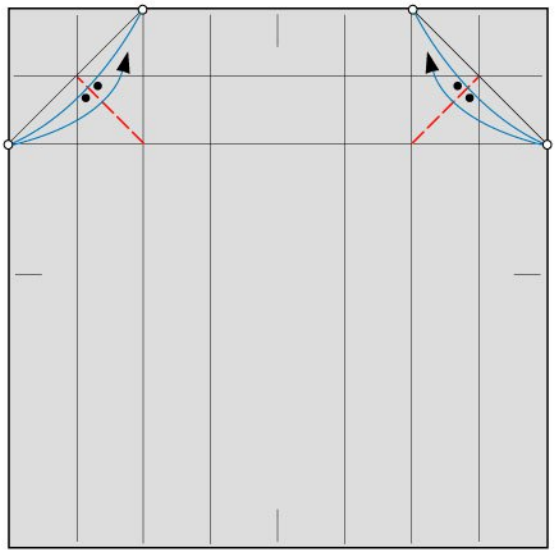
COSTRUZIONE DI UN MODULO PER FORMARE UN PANNELLO SOLAIO O TETTO





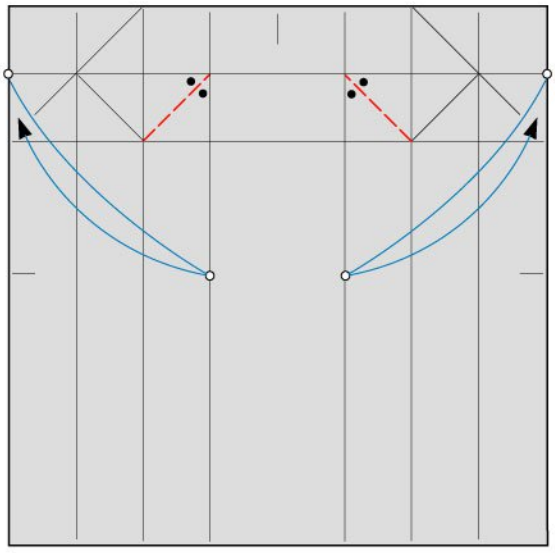
5

2 pieghe bisettrici a valle



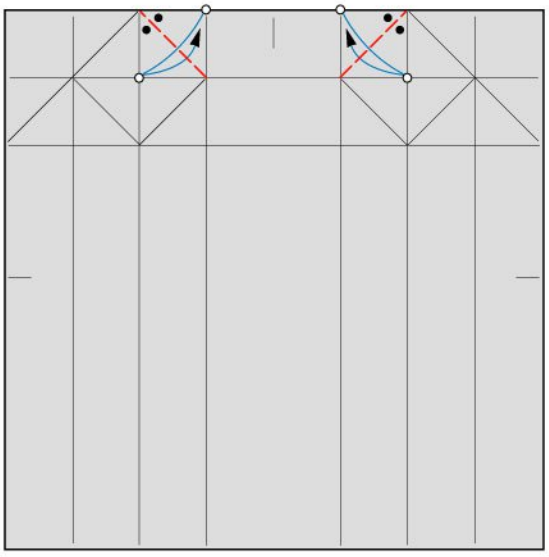
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2 pieghe bisettrici a valle



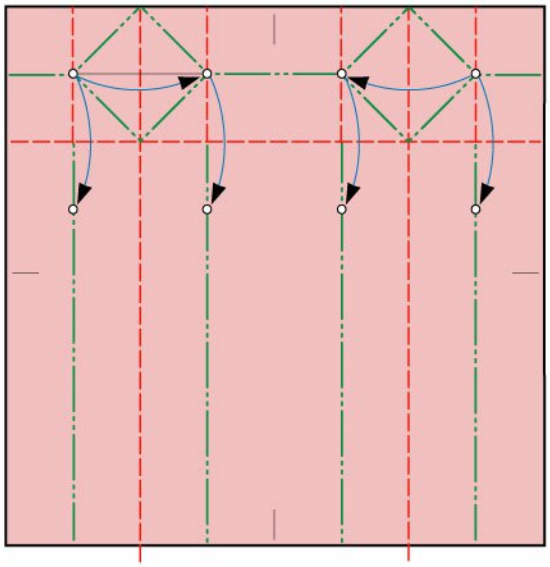
7

2 pieghe bisettrici a valle



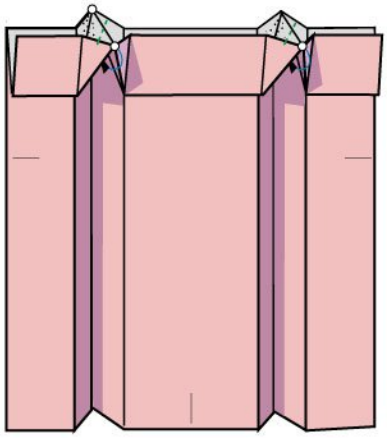
8

2 pieghe bisettrici a valle e ribaltate



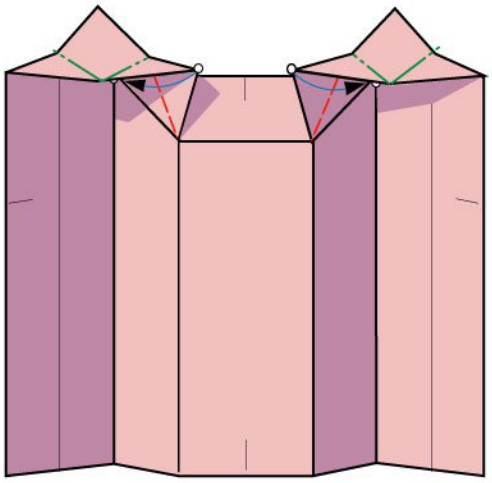
9

Ripiegando a valle ed a monte ruotate 3D



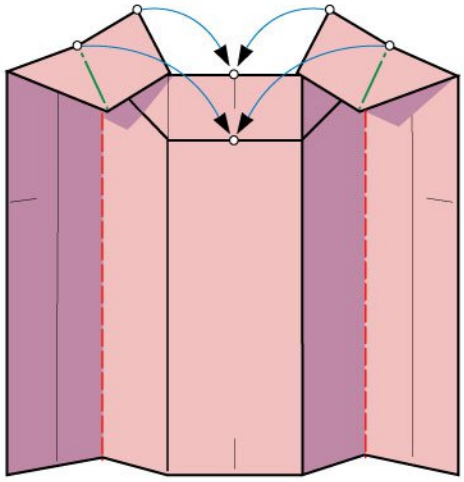
10

Rovesciate all'interno i 2 vertici indicati



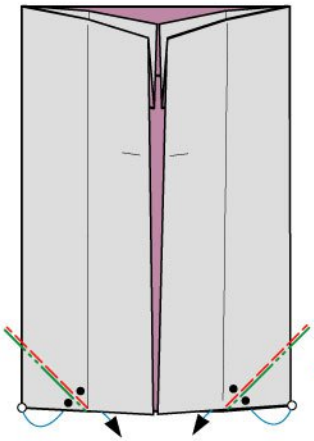
11

Per agevolare il rovesciamento dei 2 vertici può essere utile sollevare le estremità del modello



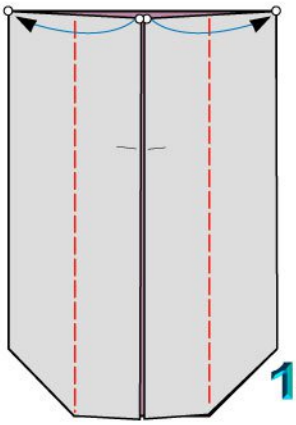
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Richiudete ripiegando a valle ed a monte



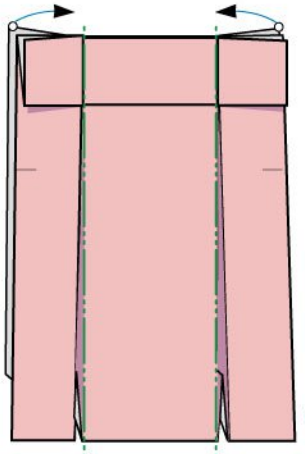
13

2 pieghe rovesce interne



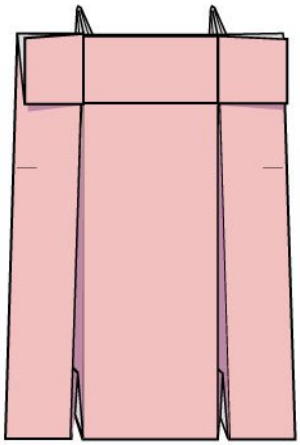
14

Ripiegando a valle ruotate



15

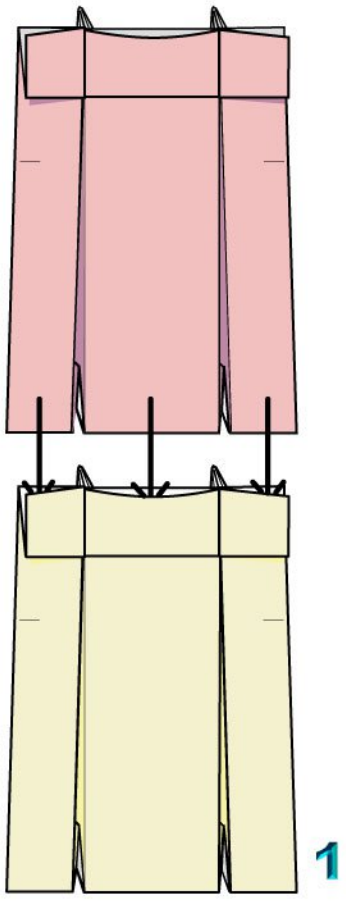
Ruotate e sistemate
ortogonalmente
le 2 fasce laterali



16

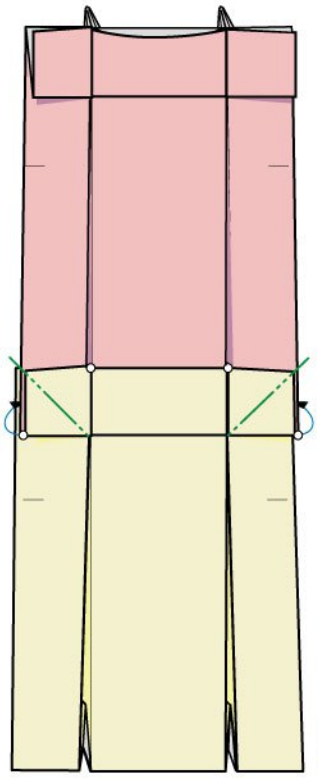
Modulo solaio
tetto ultimato

UNIONE DEI MODULI PER REALIZZARE
UN PANNELLO SOLAIO O TETTO



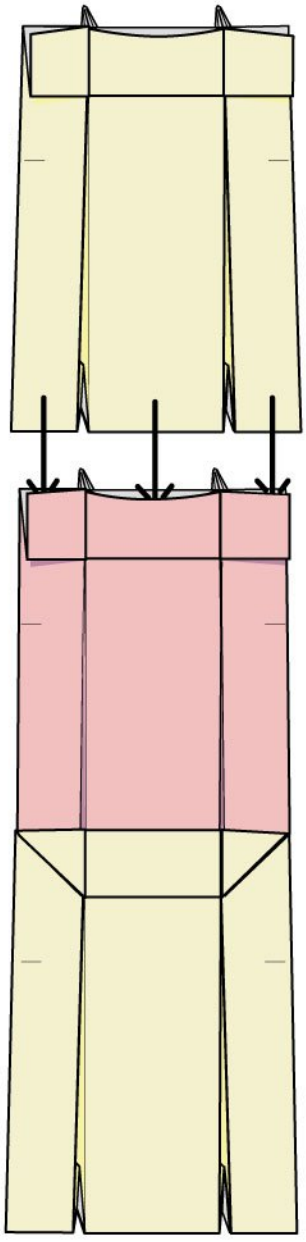
1

Inserite le 3 appendici
inferiori di un modulo
entro le tasche superiori
dell altro



2

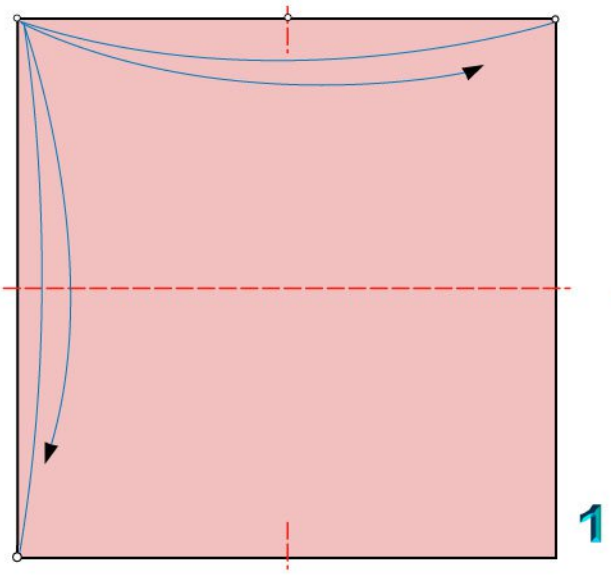
2 pieghe a monte, ruotate
e bloccate l'unione



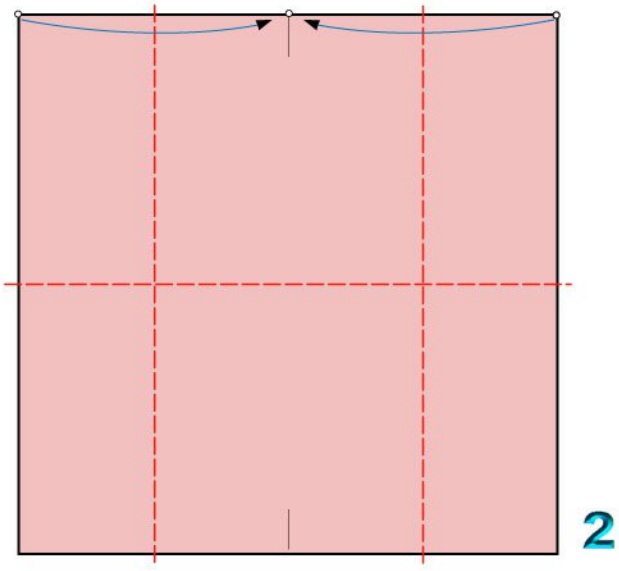
3

Ripetete l unione con
un altro modulo

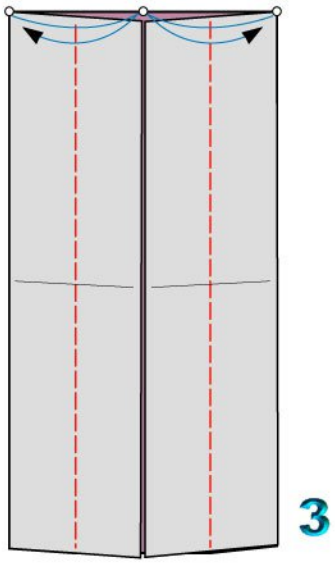
COSTRUZIONE DI UN MODULO BASE PER IL COLMO DI UN TETTO



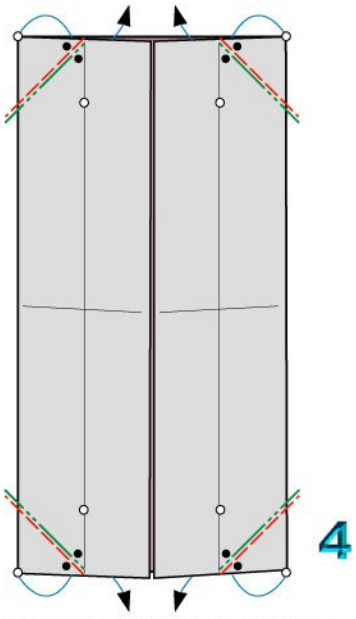
3 pieghe a valle, 2 piccole



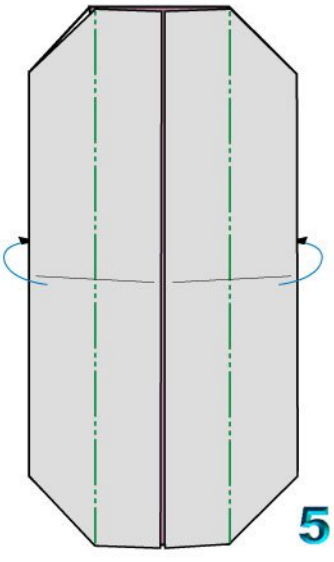
3 pieghe a valle e ruotate



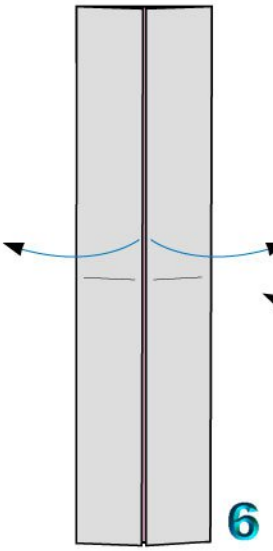
2 pieghe a valle



4 pieghe rovesce interne

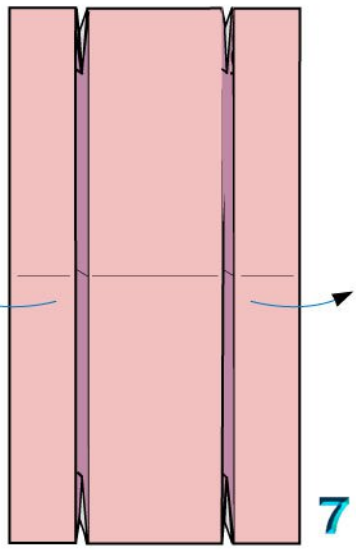


2 pieghe a monte e ruotate



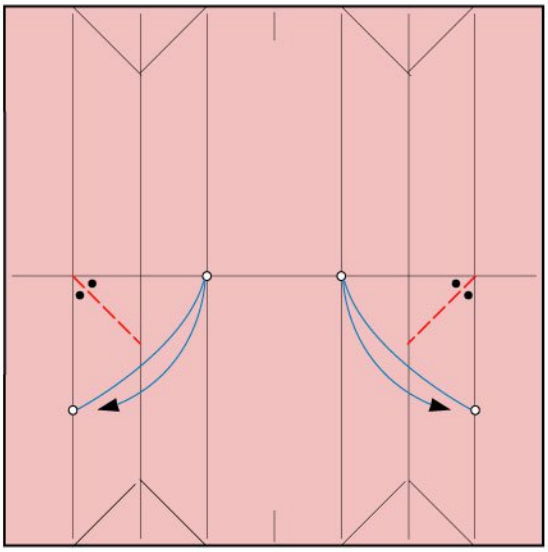
6

Aprite



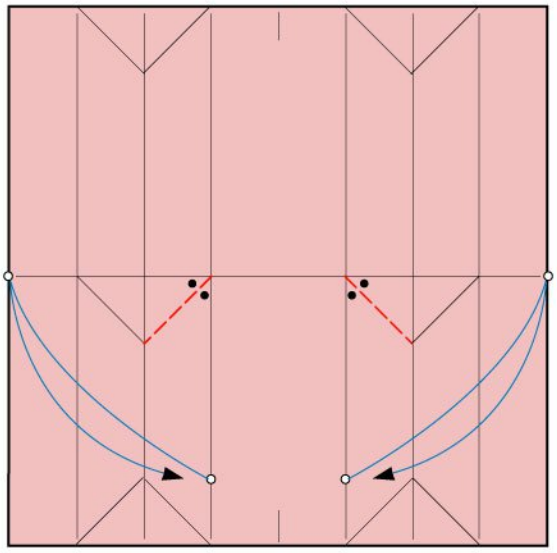
7

Continuate ad aprire



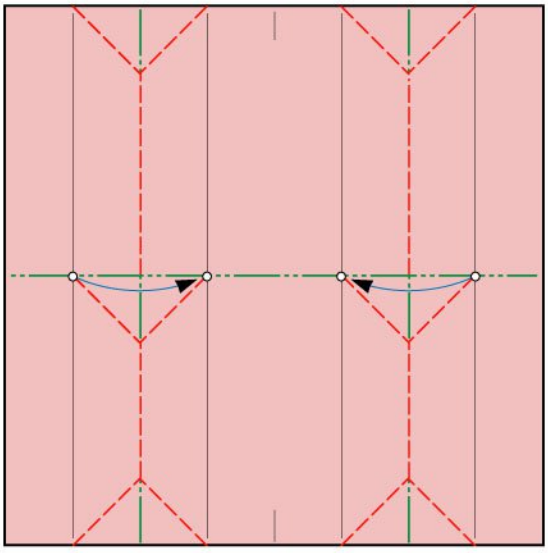
8

2 pieghe bisettrici a valle



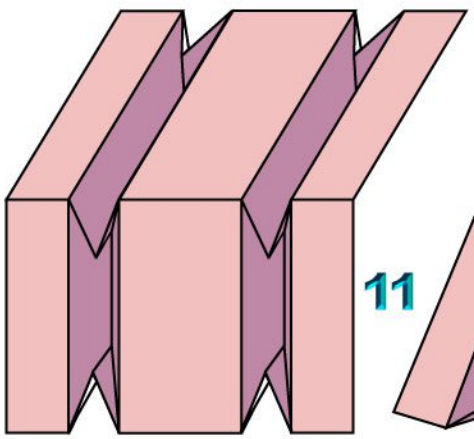
9

2 pieghe bisettrici a valle

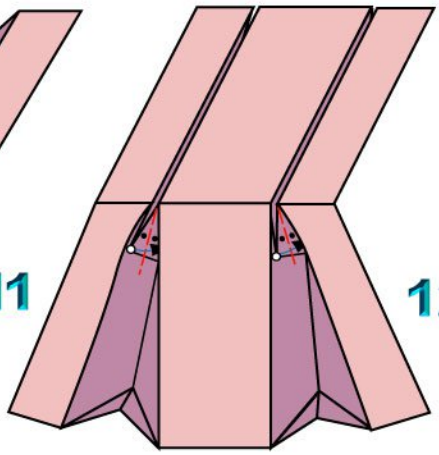


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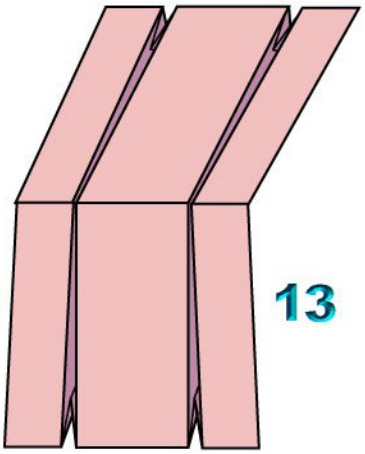
Ripiegando a valle ed a monte modellate 3D



11

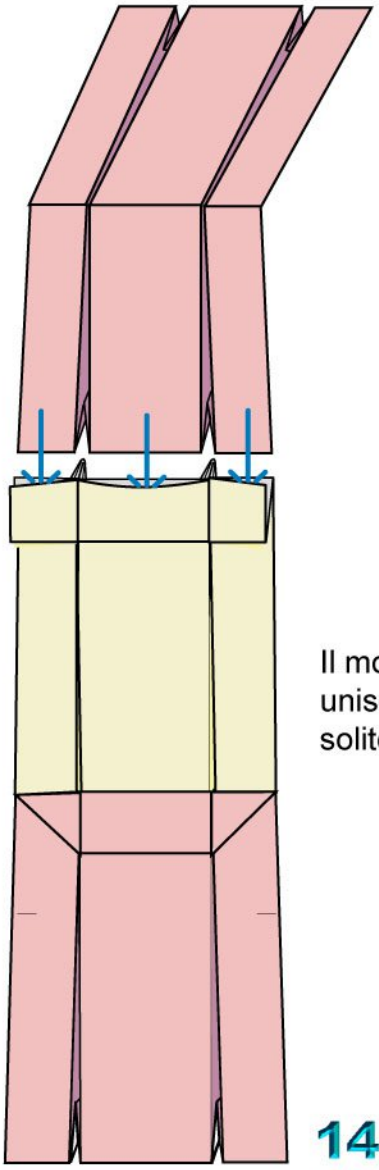


12



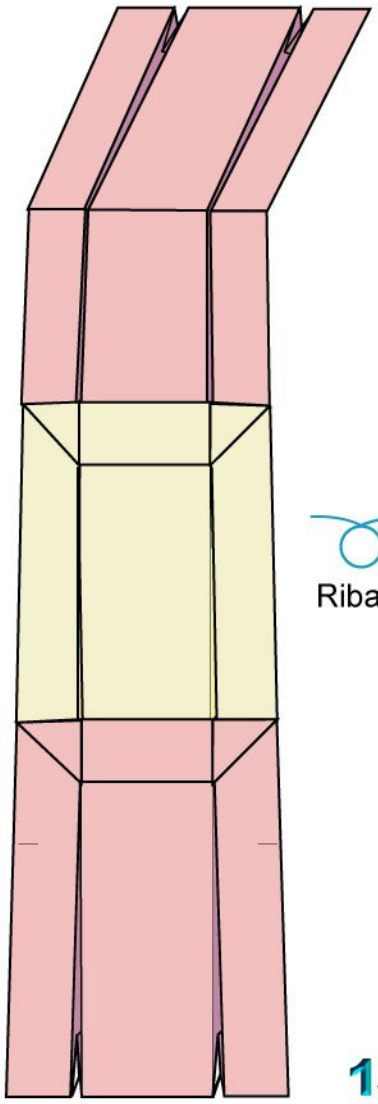
13

Eseguite 2 piccole pieghe a valle per bloccare le nervature in posizione chiusa



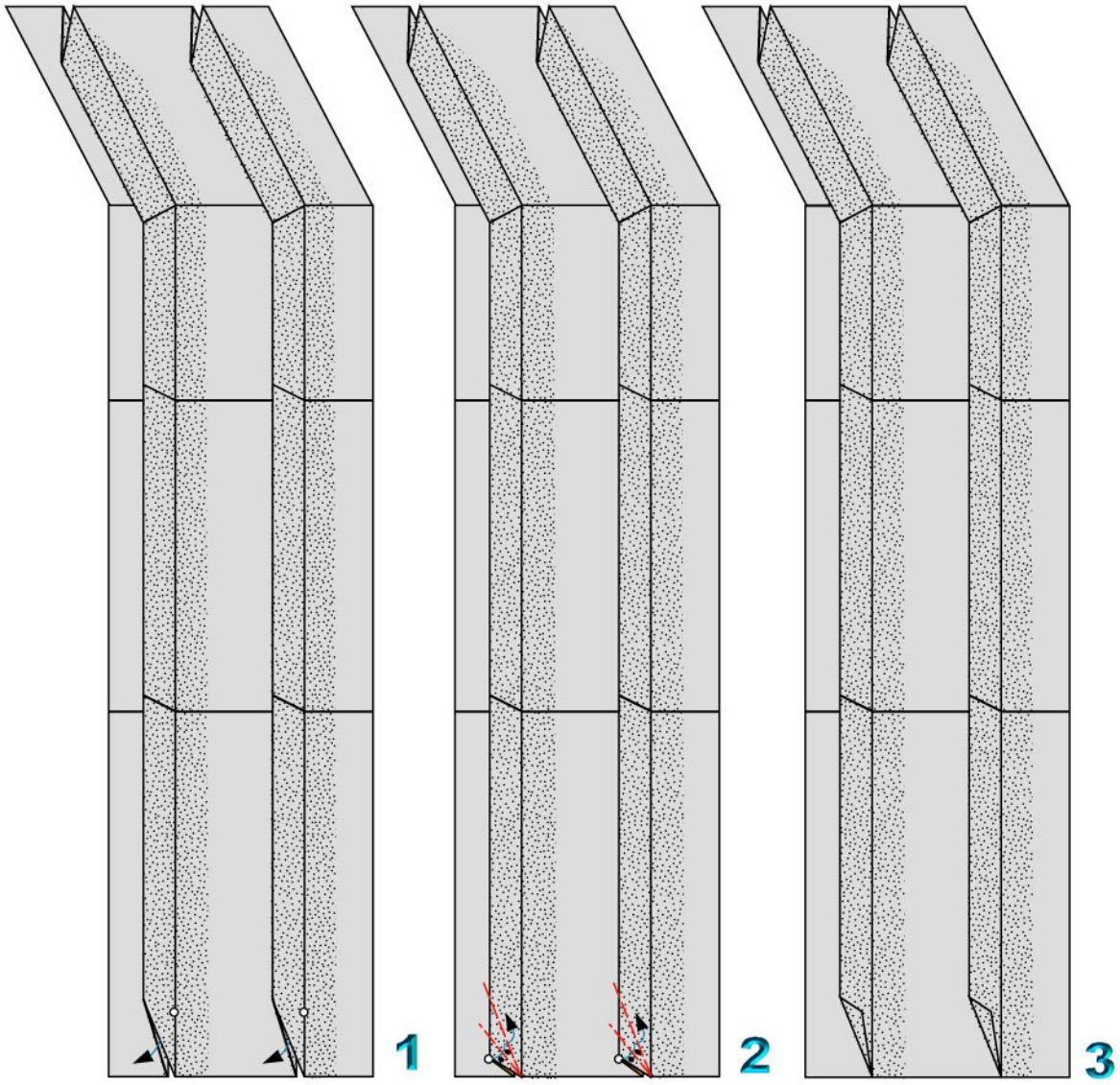
14

Il modulo “colmo” si unisce e blocca nel solito modo



15

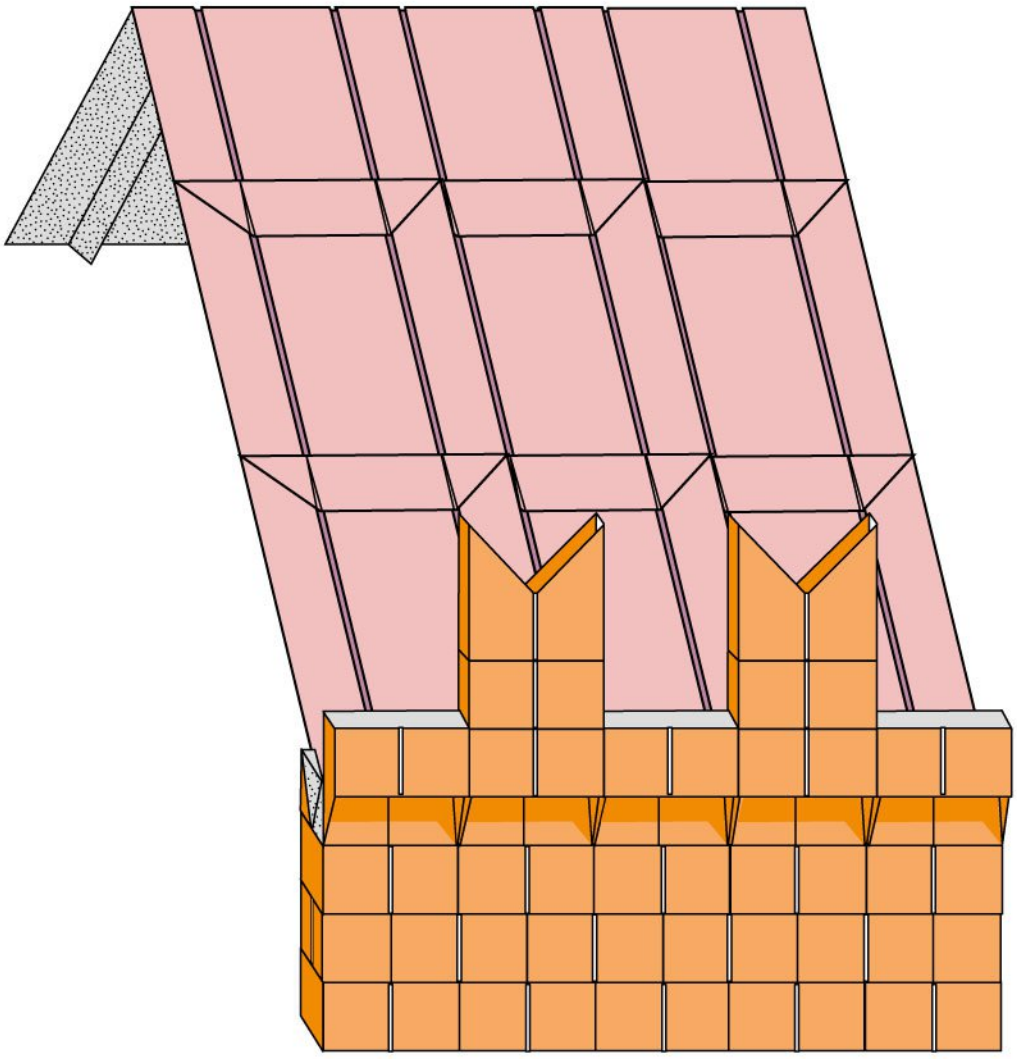
Ribaltate



L‘estremità del pannello tetto va elaborata per poterlo appoggiare sui supporti

Le estremità delle nervature si ripiegano 2 volte a valle

Vista inferiore del pannello tetto ultimato

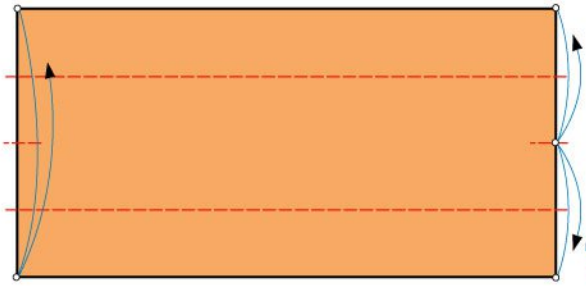


ESEMPIO DI TETTO APPOGGIATO SU UN SUPPORTO MURARIO,
IN QUESTO CASO UN CAMMINO DI RONDA CON PIOMBATOIE

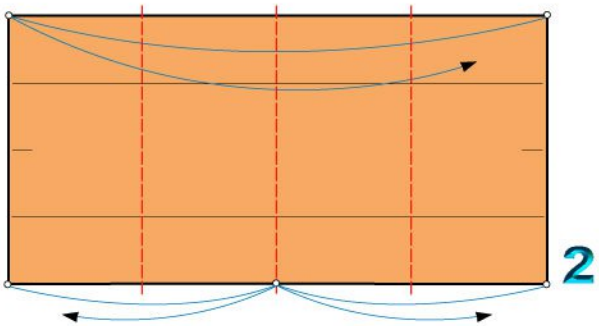
COSTRUZIONE BLOCCO PER TIMPANO

Il timpano è quella parte di muro di forma triangolare compresa tra 2 falde di muro, sulla quale si appoggia lateralmente il solaio del tetto.

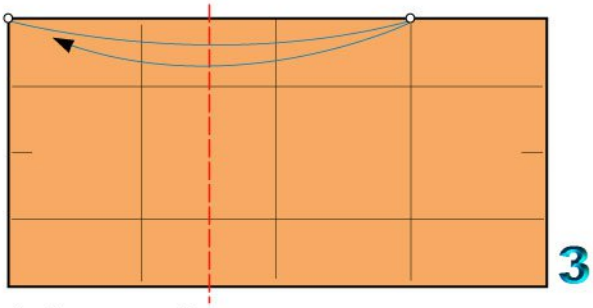
Il blocco che si costruisce consente unicamente la realizzazione di timpani di 45°.



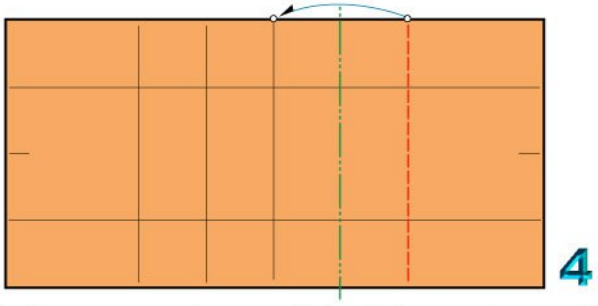
Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 longitudinali



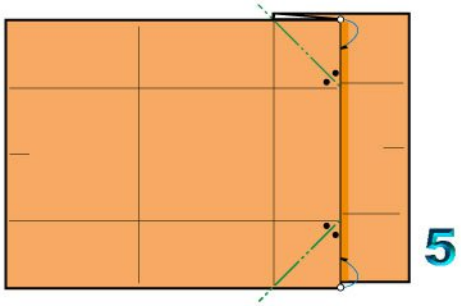
3 pieghe a valle



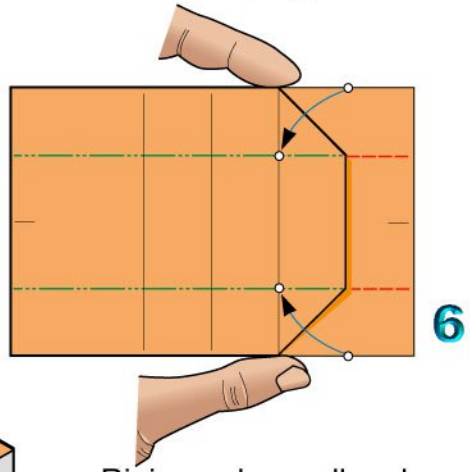
1 piega a valle



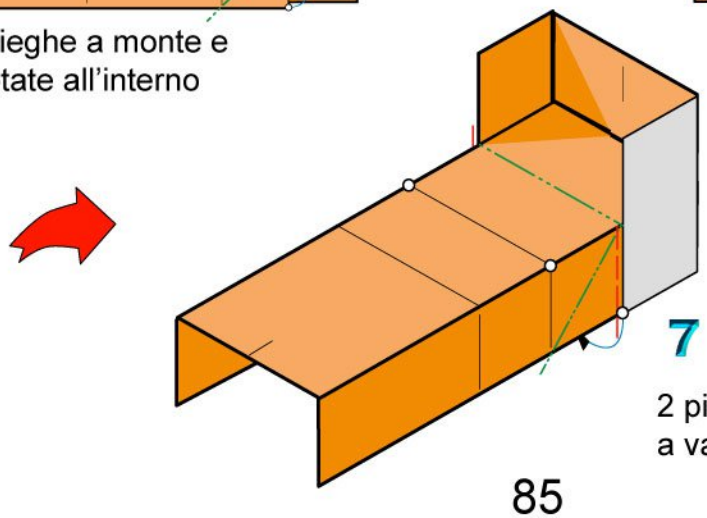
1 piega a monte e ruotate ripiegando a valle



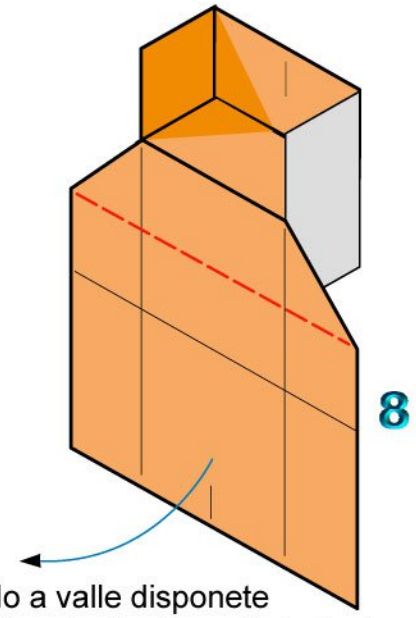
2 pieghe a monte e ruotate all'interno



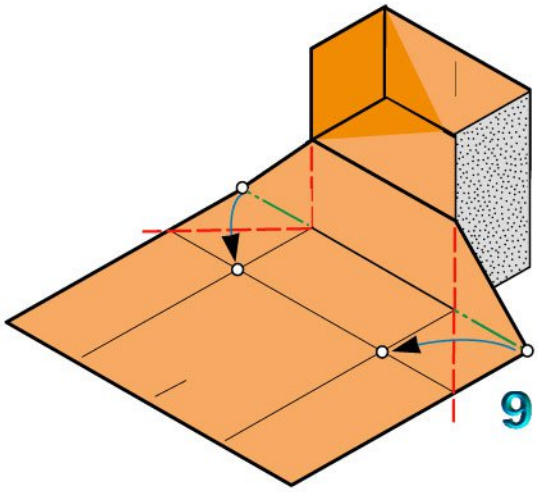
Ripiegando a valle ed a monte modellate 3D



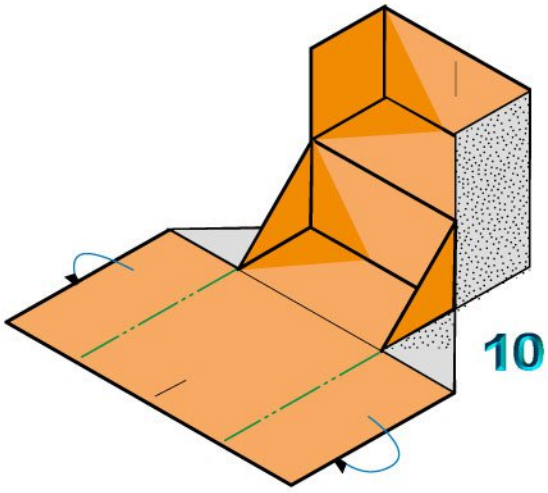
2 pieghe a monte e, ripiegando a valle, modellate 3D



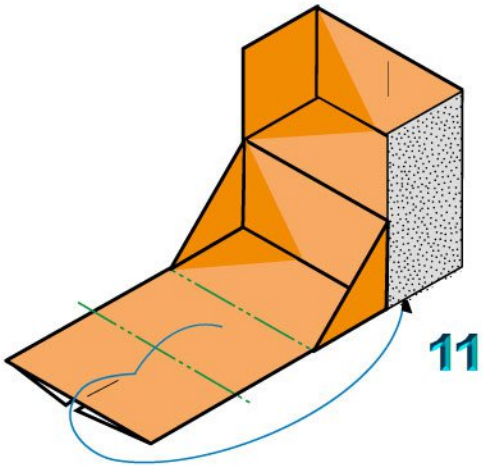
ripiegando a valle disponete
orizzontalmente il rettangolo indicato



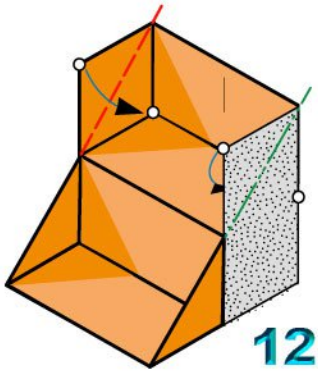
2 pieghe rovesce interne



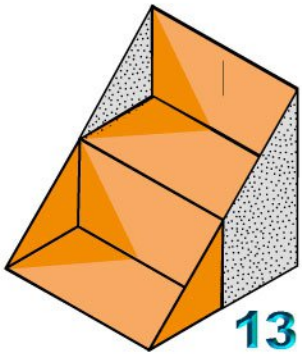
ruotate ripiegando a monte



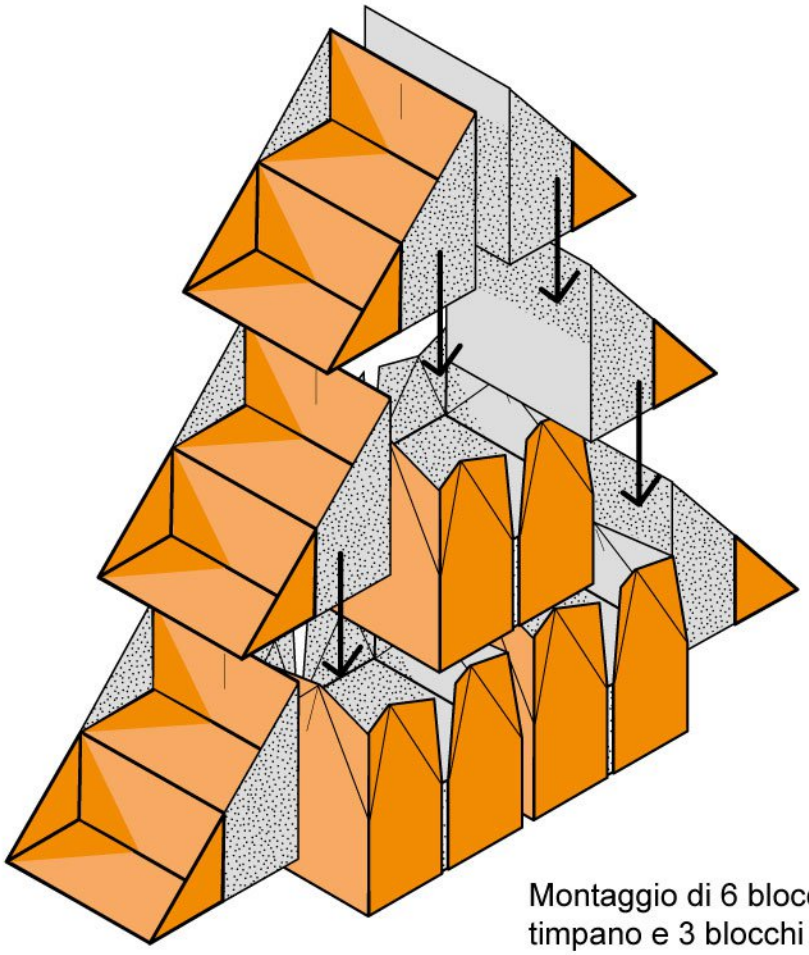
ruotate ripiegando a monte
e intascate all'interno



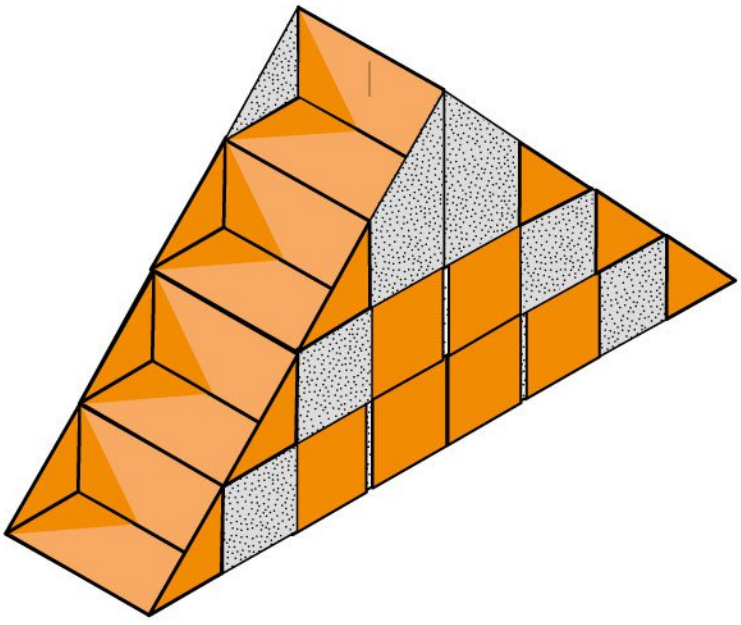
2 pieghe a monte, 1 per lato



Blocco per timpano ultimato



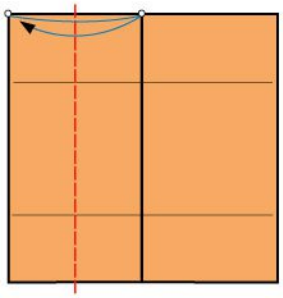
Montaggio di 6 blocchi per timpano e 3 blocchi A



ESEMPIO DI TIMPANO ULTIMATO

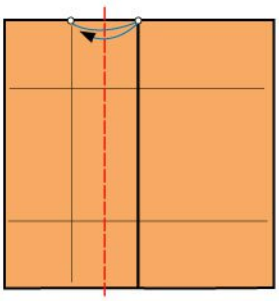
COSTRUZIONE DEL SUPPORTO MENSOLA PER TETTO

Blocco che consente il montaggio del tetto con cornicione a sbalzo e con grondaia



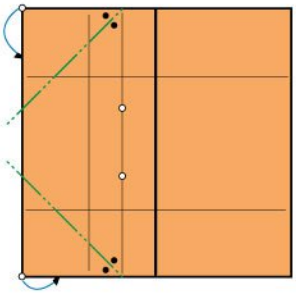
6

Partite dalla fig.n.6 del blocco A;1 piega a valle



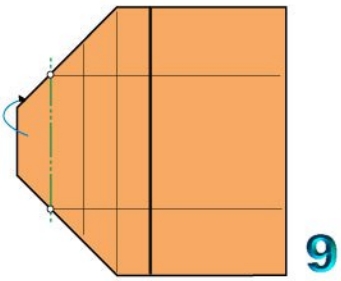
7

1 piega a valle solo sulla sup. in vista



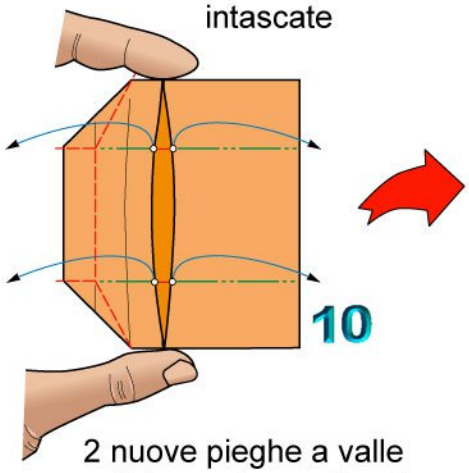
8

2 pieghe bisettrici a monte, ruotate ed intascate



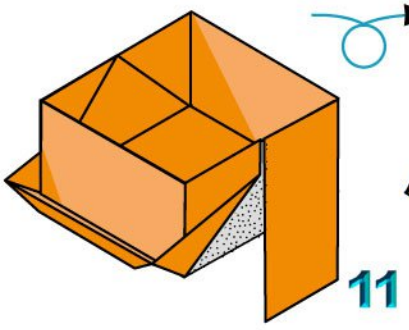
9

1 piega a monte e ruotate



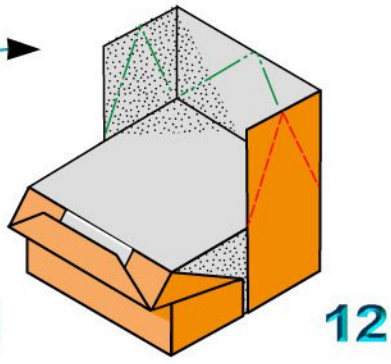
10

2 nuove pieghe a valle e,ripiegando a valle ed a monte,modellate 3D



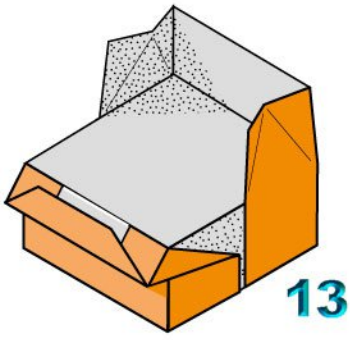
11

ribaltate



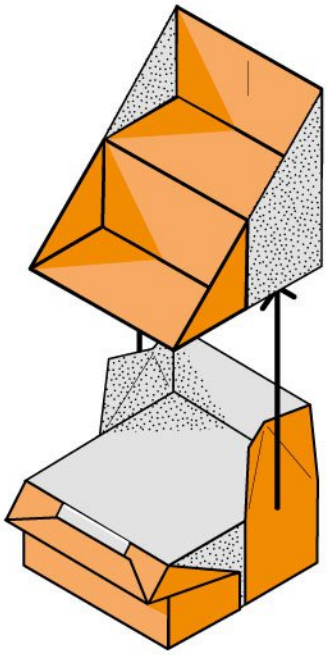
12

con una serie di pieghe a valle restringete il perimetro superiore

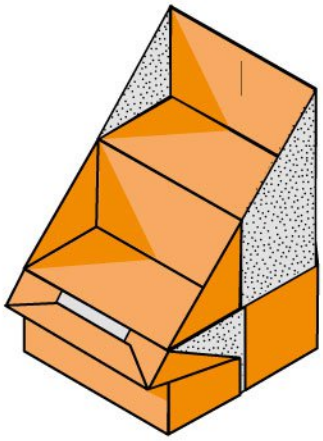


13

supporto mensola per tetto ultimato



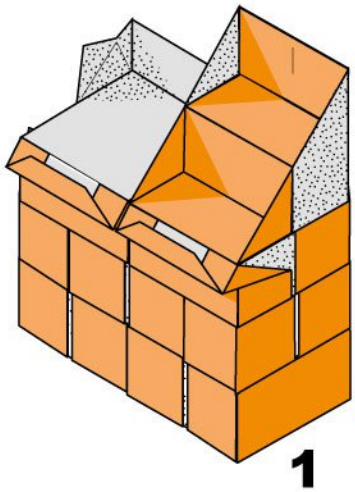
inserimento di un blocco per timpano
in un supporto mensola tetto



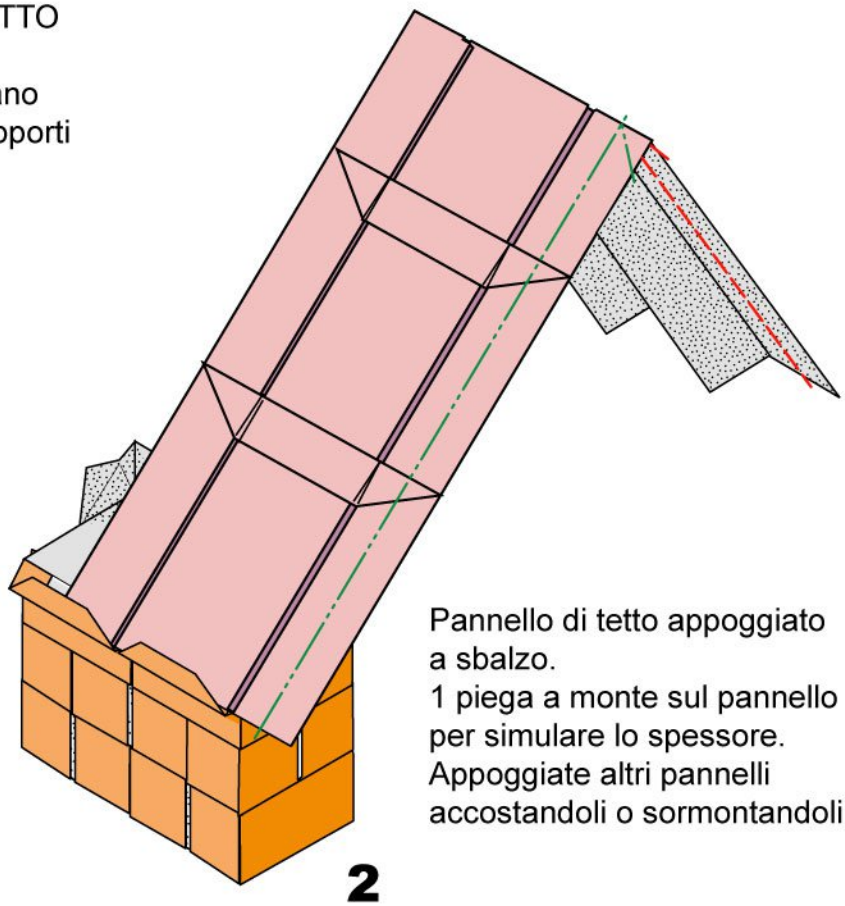
supporto mensola per tetto con
inserito un blocco per timpano ultimato

COSTRUZIONE DI UN TETTO

Inserite un blocco per timpano
sul primo di una serie di supporti
per mensola

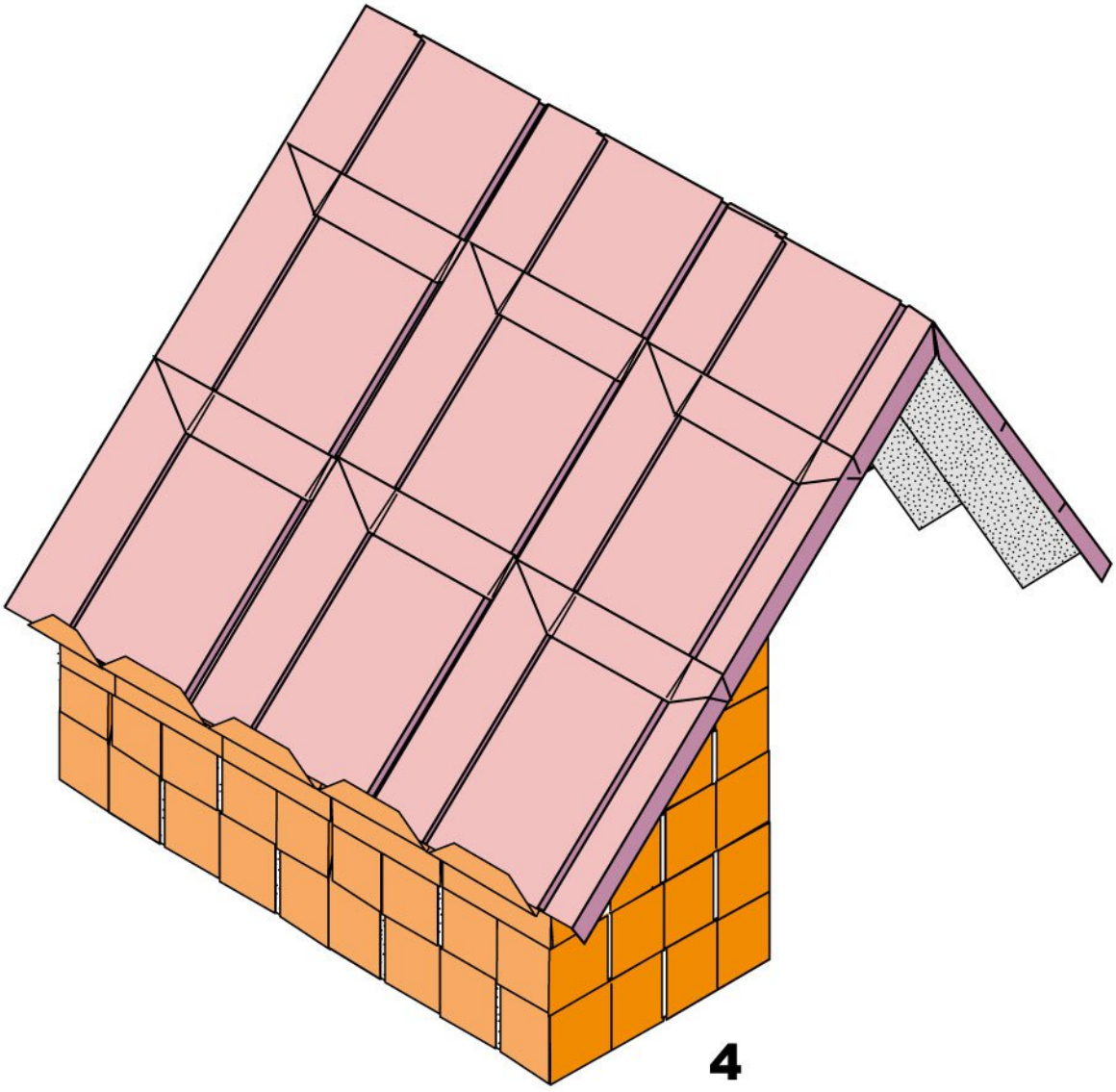


1



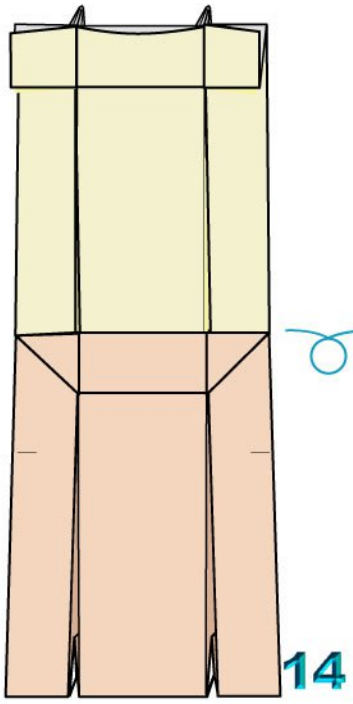
2

Pannello di tetto appoggiato
a sbalzo.
1 piega a monte sul pannello
per simulare lo spessore.
Appoggiate altri pannelli
accostandoli o sormontandoli



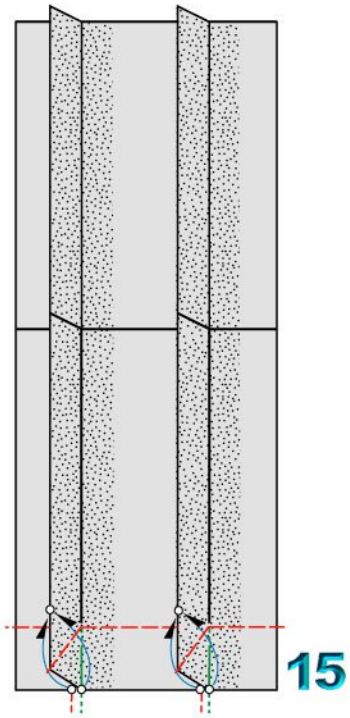
ESEMPIO DI TETTO CON 3 PANNELLI

GRANDE SOLAIO



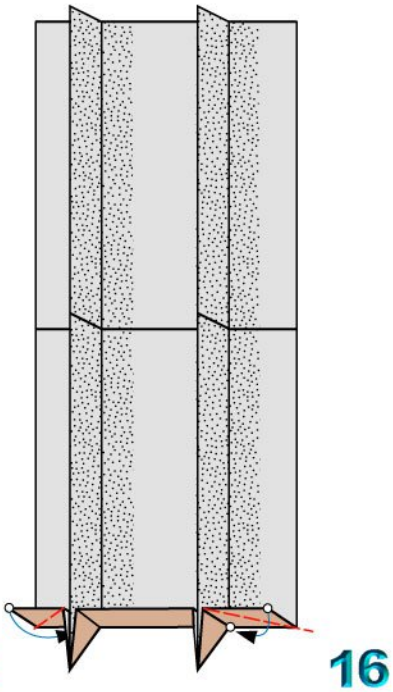
14

Ribaltate



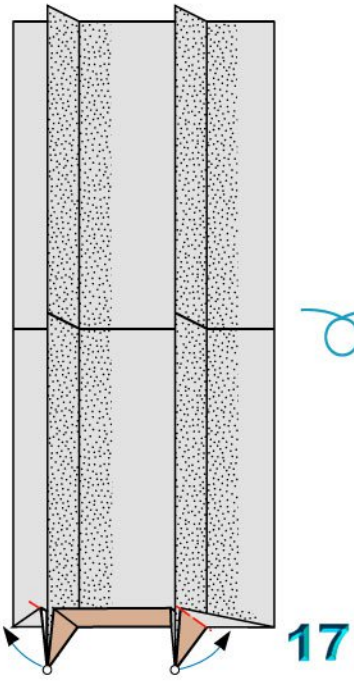
15

2 pieghe rovesce esterne



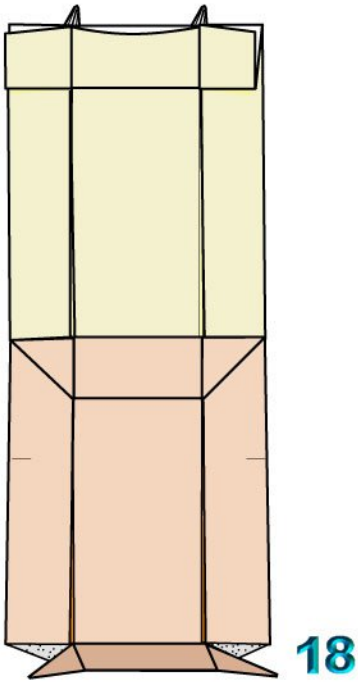
16

2 pieghe a valle e ruotate



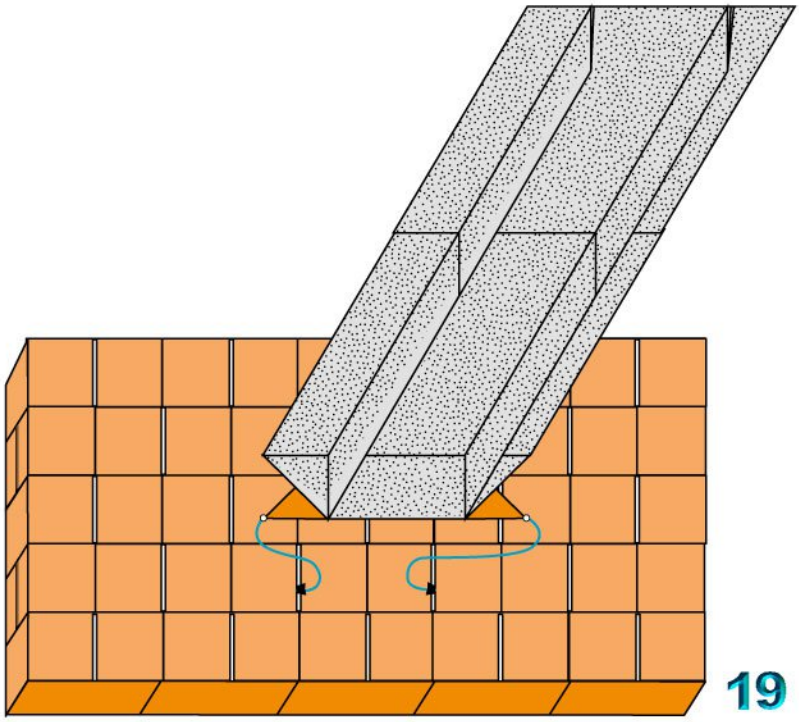
17

“Aprite”ruotando a valle

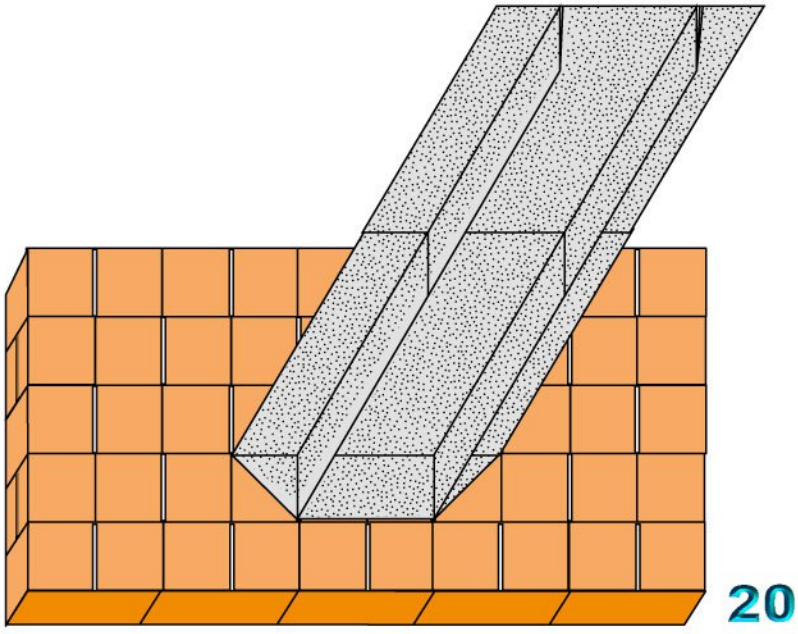


18

Pannello pronto per essere agganciato



Il solaio si vincola alle pareti inserendone i vertici
nelle fessure presenti nel centro dei blocchi base A



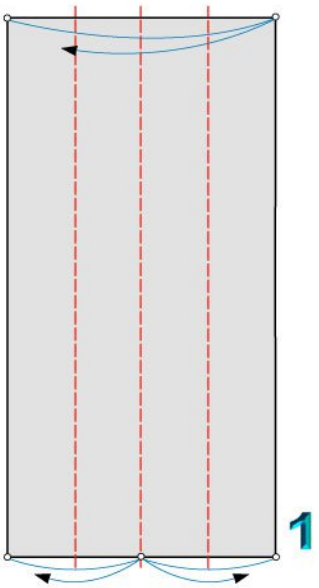
PANNELLO DI SOLAIO FISSATO ALLA PARETE

ROSONE

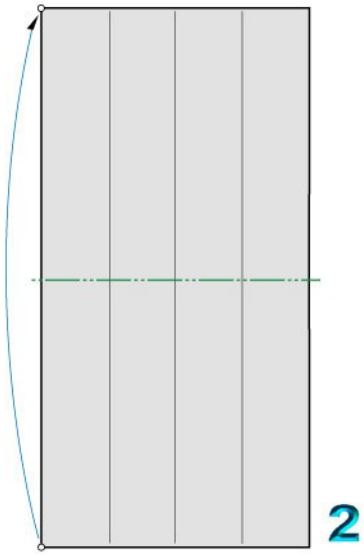
Principale finestra delle chiese romaniche e gotiche, di grandi dimensioni e di forma circolare, posta sopra l'ingresso della navata principale e di quelle dei transetti.

Era impreziosito da decorazioni in pietra e vetrate colorate.

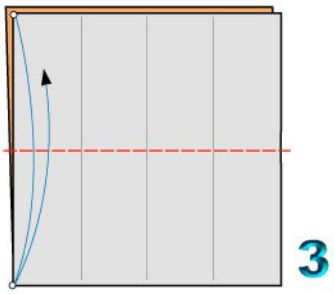
Gli 8 moduli servono per simulare la struttura in pietra a sostegno delle vetrate.



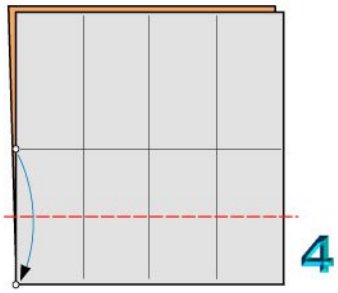
3 pieghe a valle



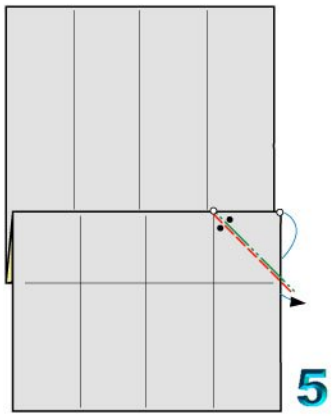
1 piega a monte e ruotate



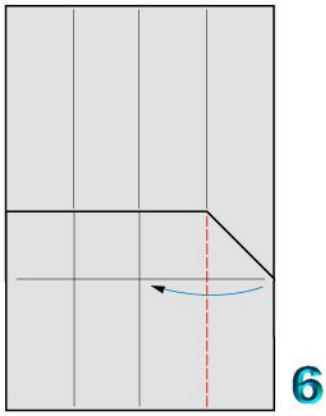
1 piega a valle solo sulla sup. in vista



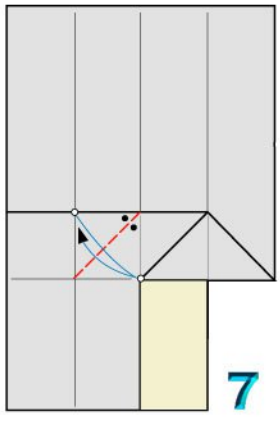
1 piega a valle e ruotate



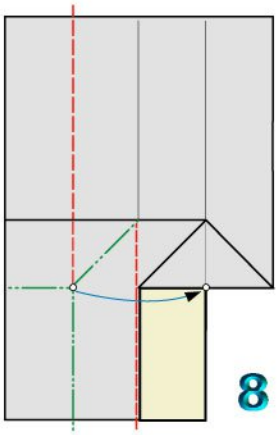
1 piega rovescia interna



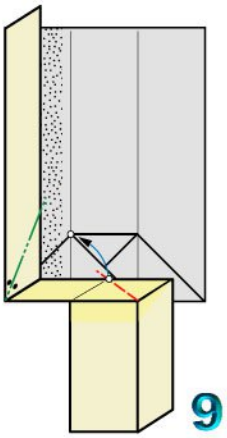
ruotate ripiegando a valle



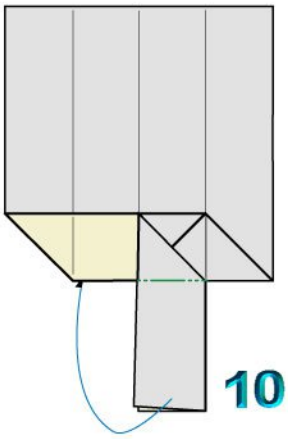
1 piega bisettrice a valle



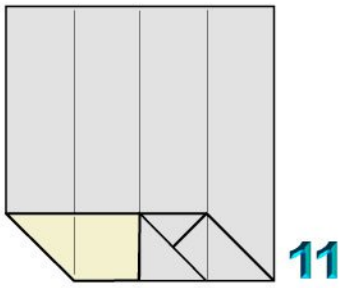
1 piega a monte e, ripiegando a valle ed a monte, modellate 3D



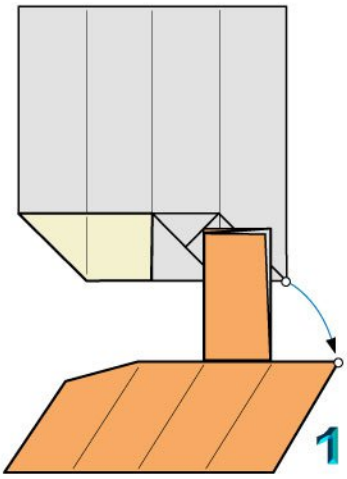
mediante 2 pieghe, 1 a valle ed 1 a monte, ruotate 2D



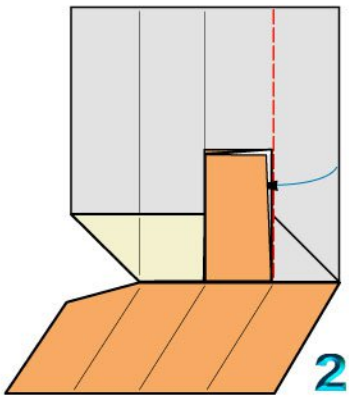
1 piega a monte e ruotate



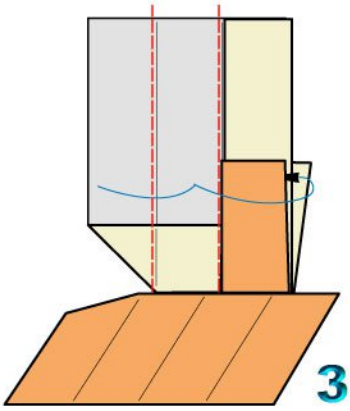
modulo pronto per il montaggio: costruitene altri 7



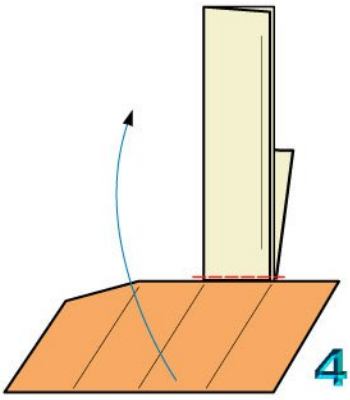
Unione di 2 moduli



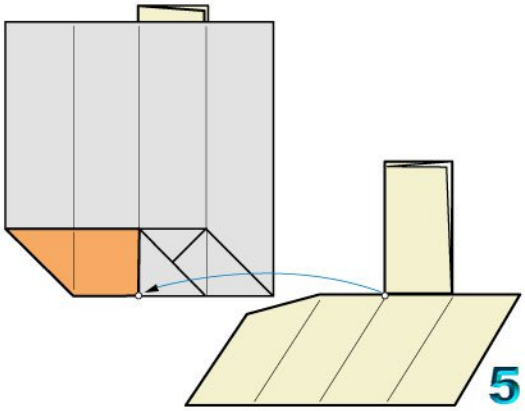
Ripiegando a valle intascate il bordo indicato



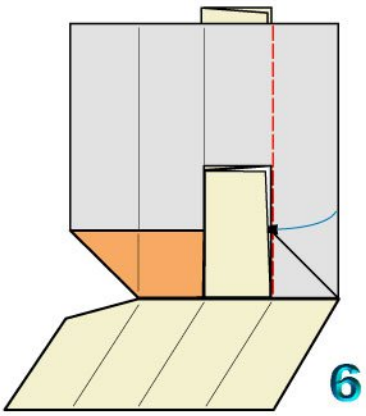
Ripiegando 2 volte a valle intascate il bordo indicato



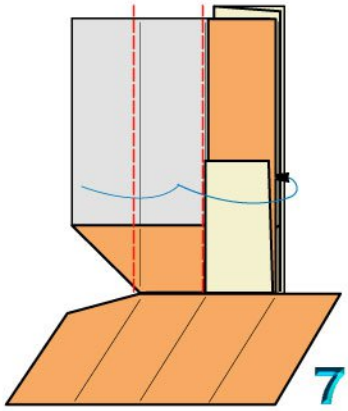
Ruotate la superficie indicata



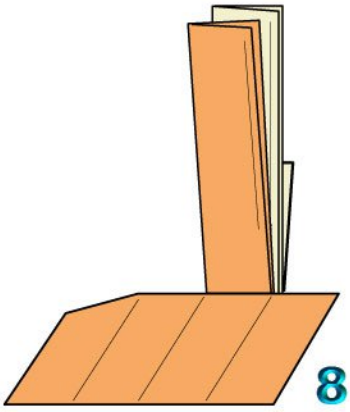
Sovrapponete un nuovo modulo



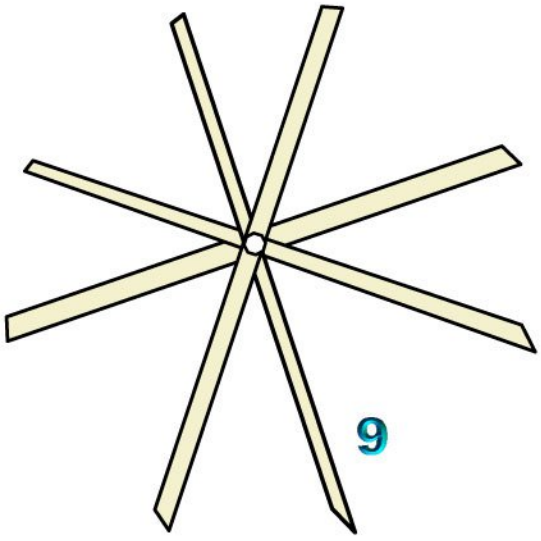
Ripiegando a valle
intascate il bordo indicato



Ripiegando 2 volte a valle
intascate il bordo indicato

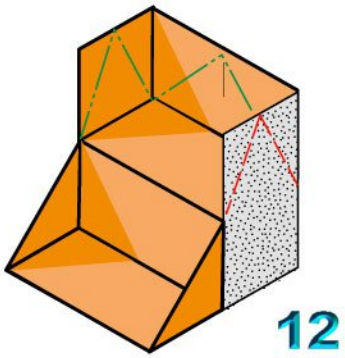


Ripetete altre 6 volte la costruzione
come già effettuato precedentemente

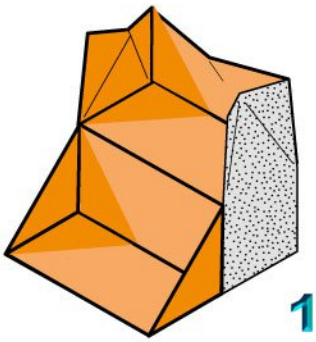


Uniti 8 moduli, la decorazione è ultimata.
Inseritene le estremità nelle fessure tra
un blocco e l'altro

Per costruire la parte inferiore del rosone sono necessari 2 blocchi per timpano e 2 blocchi per timpano modificati:

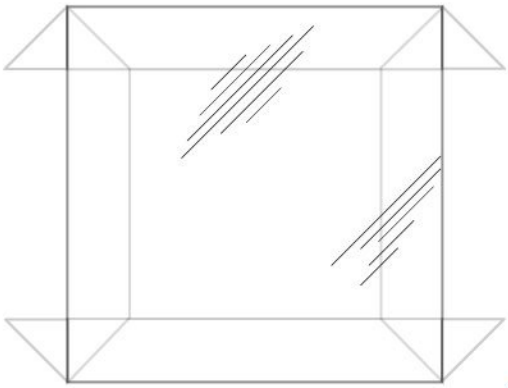


12



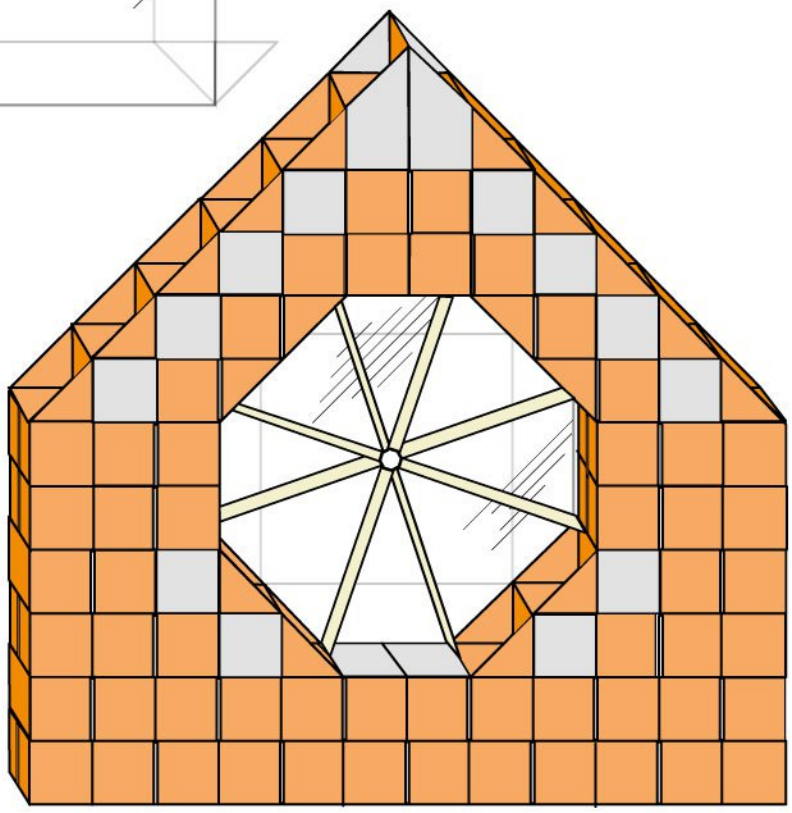
13

Partite dalla fig. n. 11 del blocco per timpano. Eseguite una serie di pieghe a valle per diminuire il perimetro superiore



Inserite verticalmente sul retro un modulo solaio costruito con acetato trasparente per simulare la vetrata, bloccatelo inserendone i vertici nelle fessure verticali tra un blocco e l'altro.

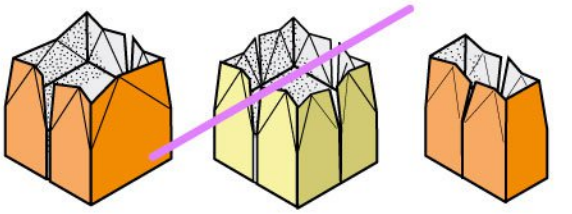
Nello stesso modo inserite la decorazione appena ultimata.



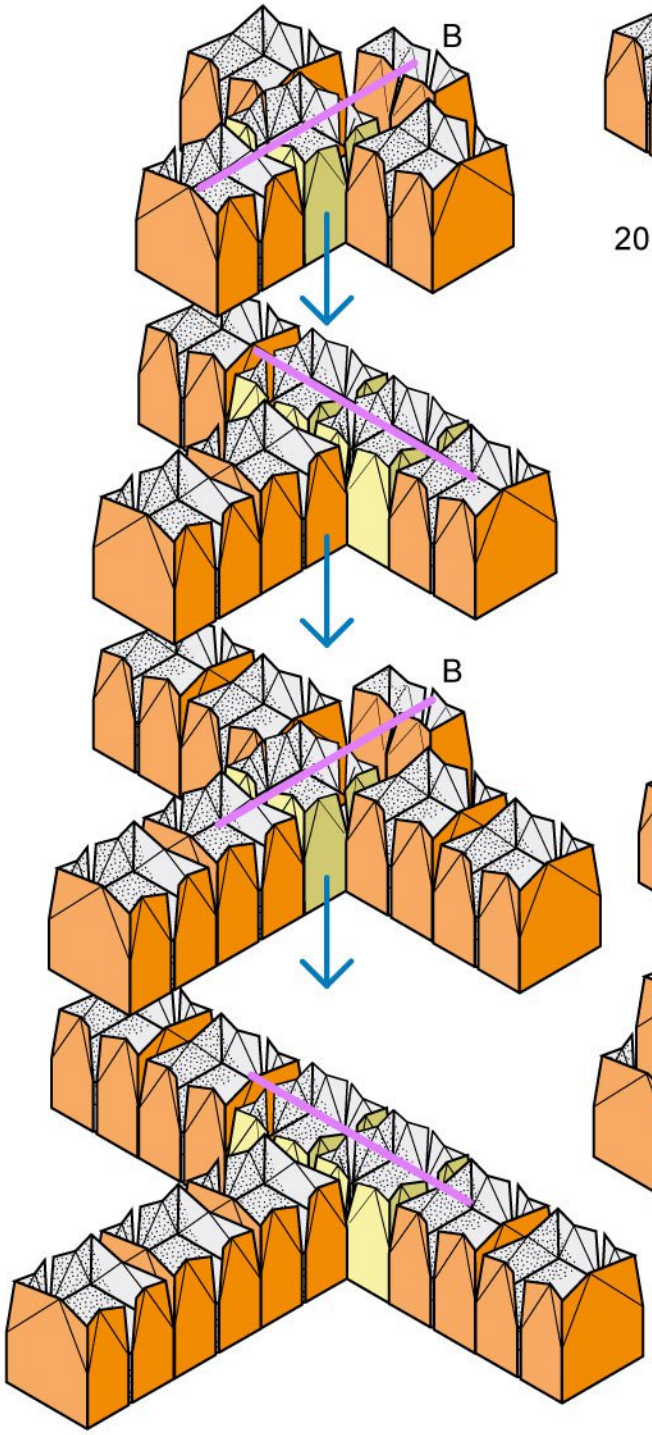
ESEMPIO DI ROSONE

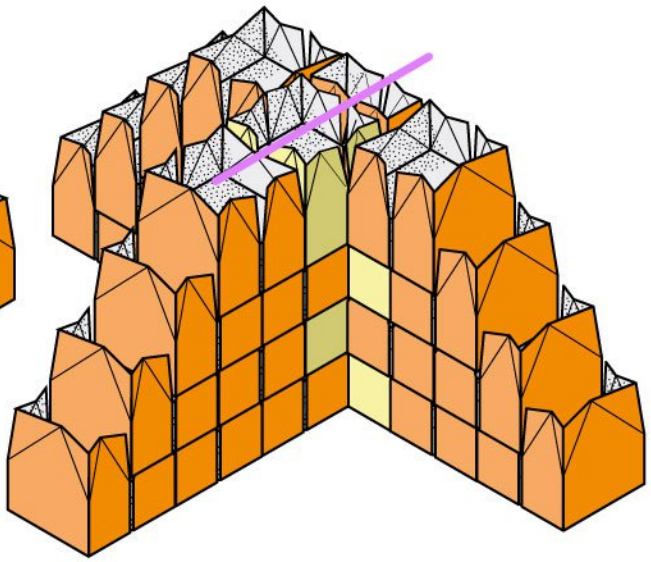
MURO A "T"

Per unire due muri che si uniscono a "T" è necessario adoperare 1 o 2 blocchi speciali A4 per ogni corso, sistemati on l'asse più debole al centro ed un semiblocco B ogni 2 corsi



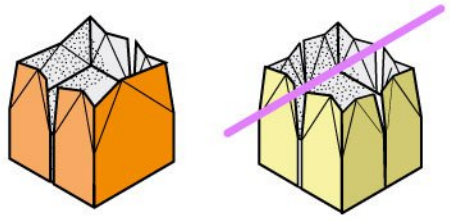
20 blocchi A 6 blocchi A4 2 blocchi B



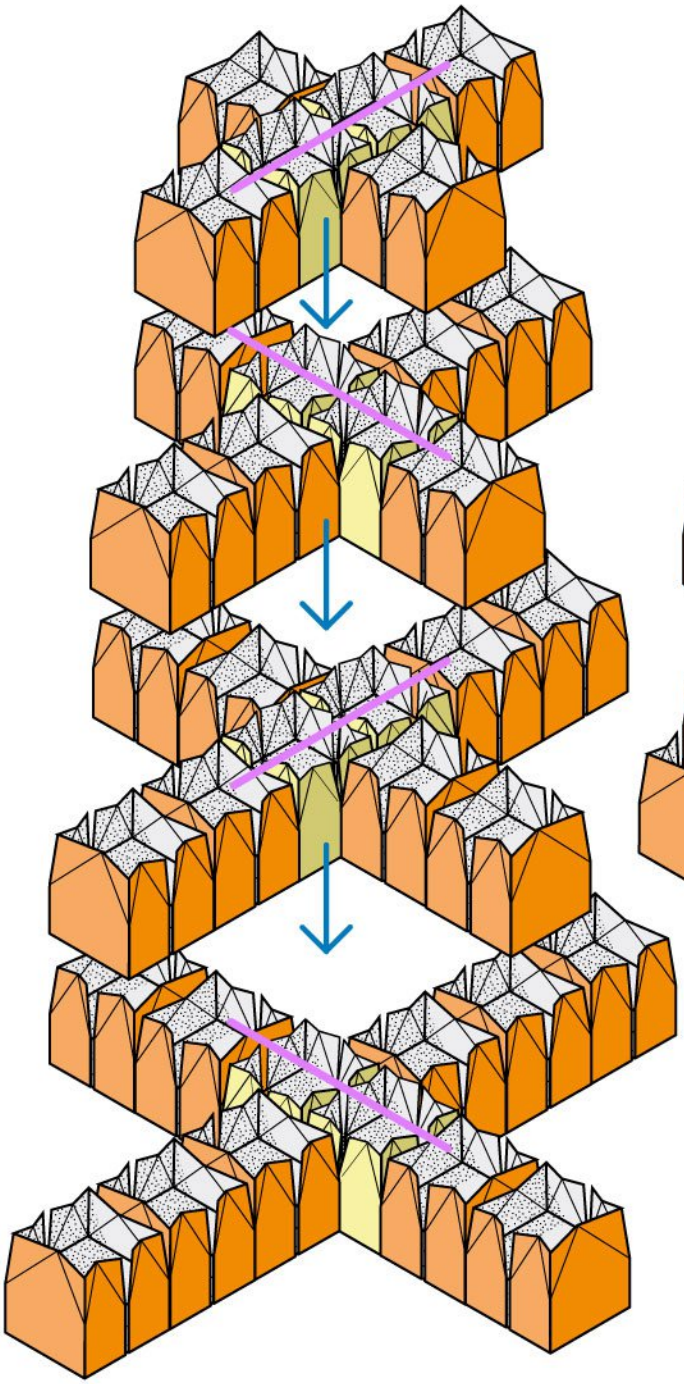


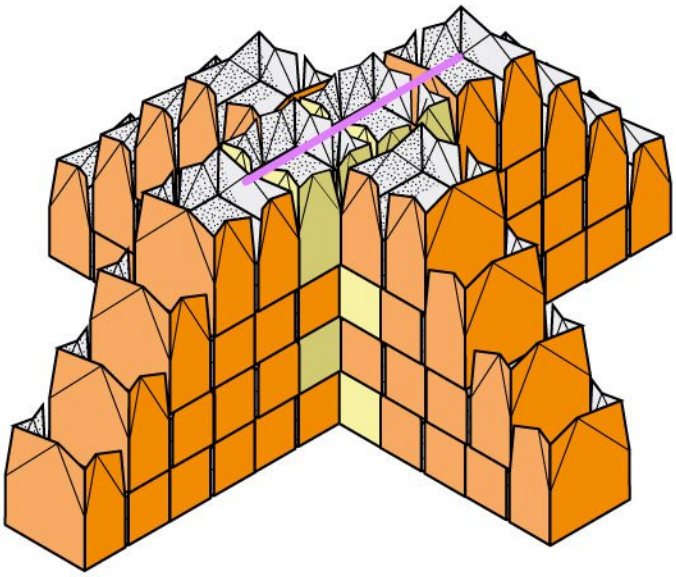
MURO A CROCE

Per unire due muri che si incrociano è necessario adoperare 2 blocchi speciali A4 per ogni corso, sistemati con l'asse più debole al centro



28 blocchi A 8 blocchi A4





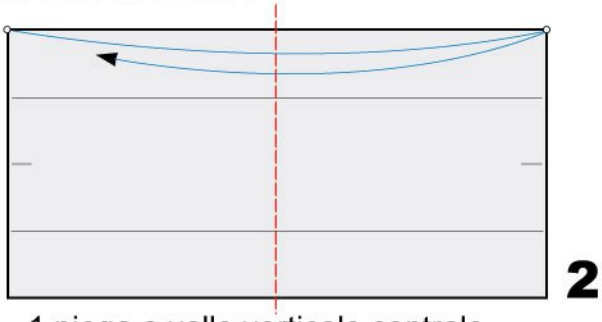
C1-GRANDE ARCHITRAVE

Questo elemento strutturale consente la realizzazione di aperture pari a 6/8 del foglio.
Per la realizzazione sono necessari 3 fogli; si uniscono 2 moduli di testa uguali ma simmetrici ed uno centrale, che deve essere costruito con carta robusta o cartoncino.

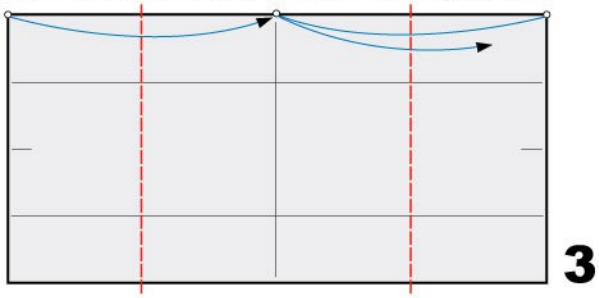
COSTRUZIONE DEL MODULO DI TESTA



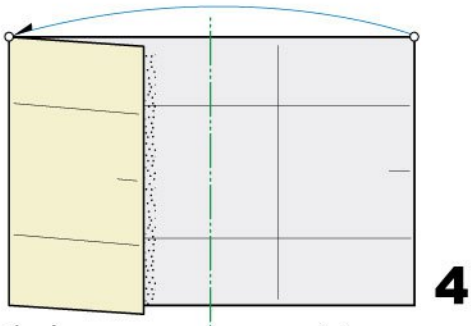
Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 longitudinali



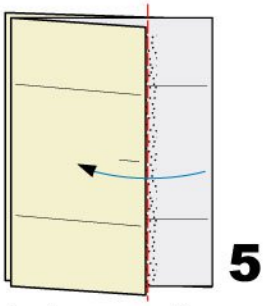
1 piega a valle verticale centrale



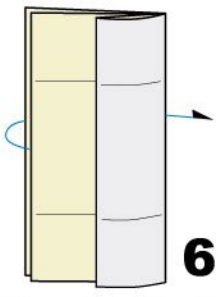
2 pieghe a valle e ruotate il bordo sinistro



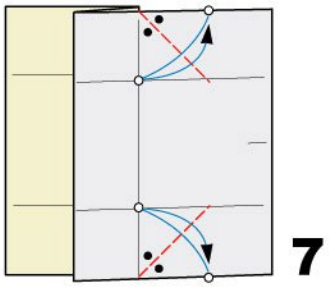
1 piega a monte e ruotate



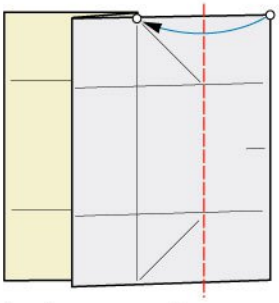
1 piega a valle e ruotate



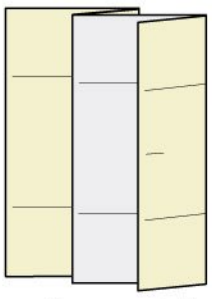
Ruotate il bordo sottostante



2 pieghe bisettrici a valle

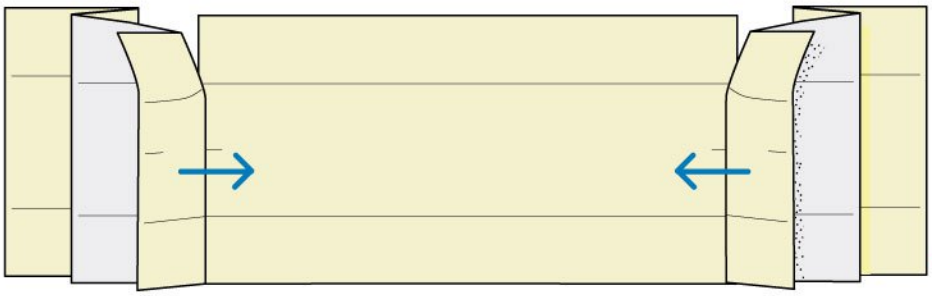


1 piega a valle e ruotate

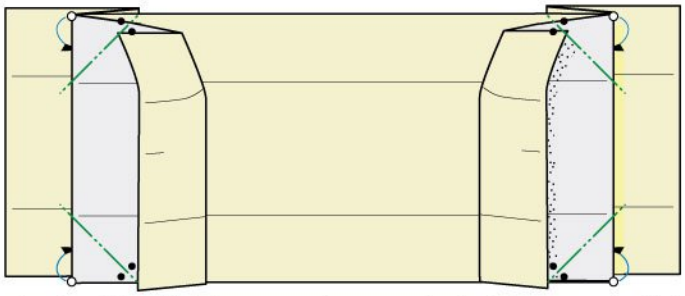


Piegate un altro modulo di testa

UNIONE DEI 2 MODULI DI TESTA CON QUELLO CENTRALE



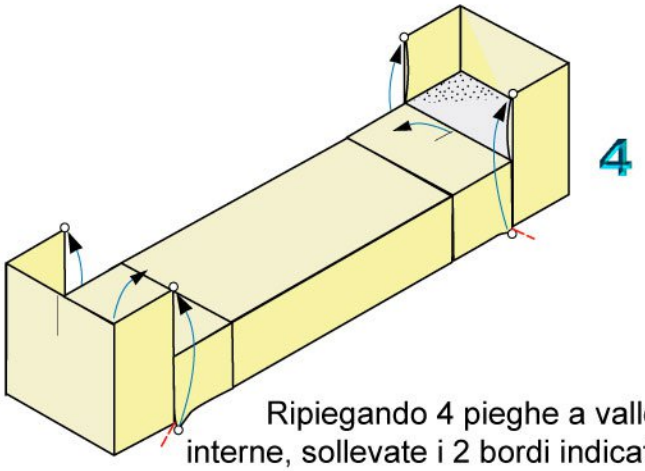
Intascate il modulo centrale nei 2 moduli di testa



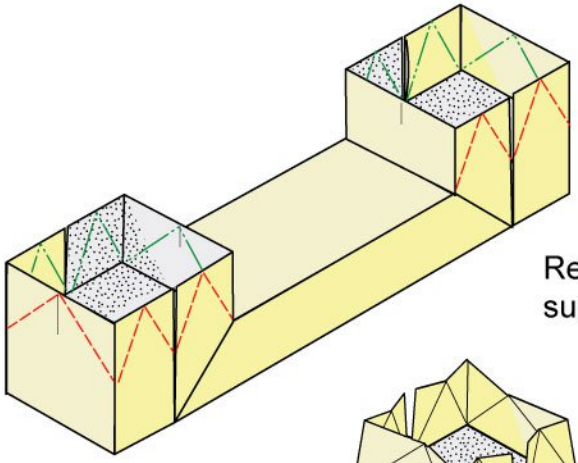
4 pieghe bisettrici a monte e ruotate bloccando il tutto



Ripiegando a valle ed a monte modellate 3D

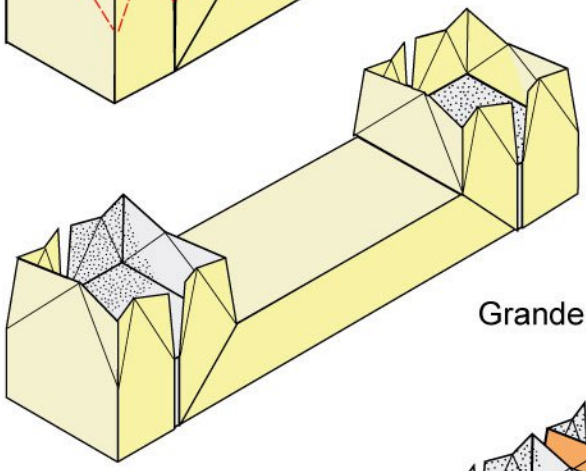


Ripiegando 4 pieghe a valle
interne, sollevate i 2 bordi indicati



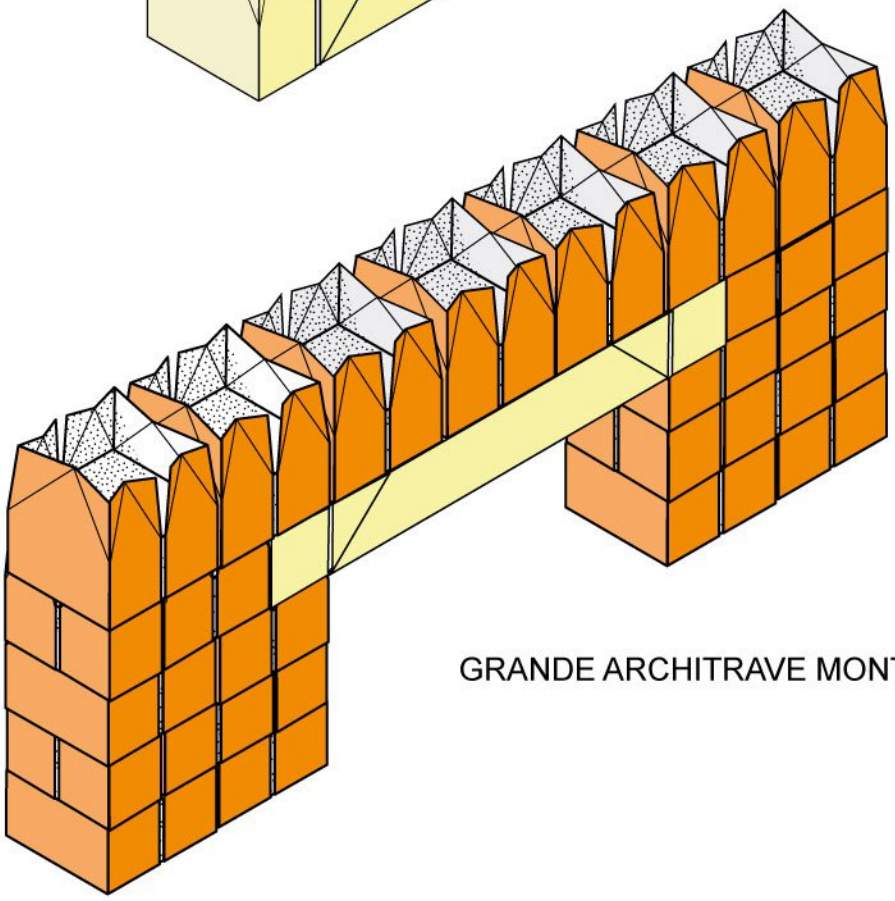
5

Restringete i perimetri superiori



6

Grande architrave ultimato



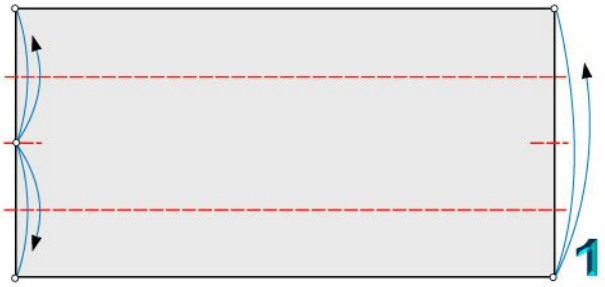
GRANDE ARCHITRAVE MONTATO

TETTO-SOLAIO SEMPLIFICATO

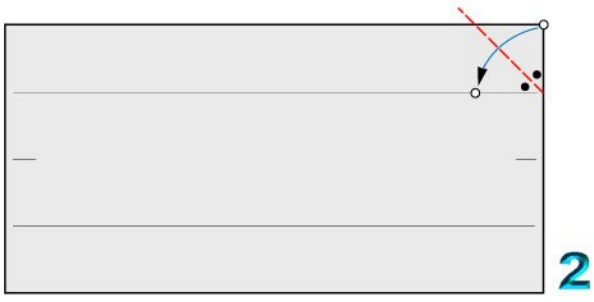
Questo è un sistema per costruire una grande struttura in modo semplice e adatto a piegatori poco esperti.

Si ottiene un pannello sufficientemente robusto; affiancandone alcuni, si realizza un tetto o un grande solaio.

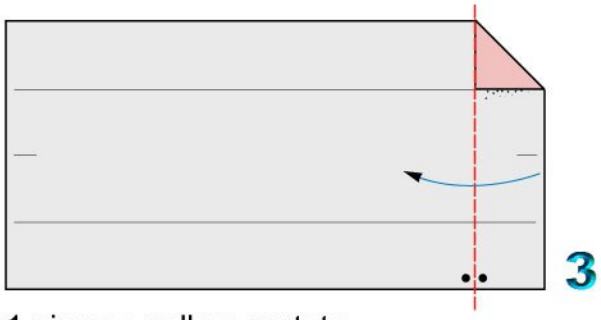
COSTRUZIONE DI UN MODULO



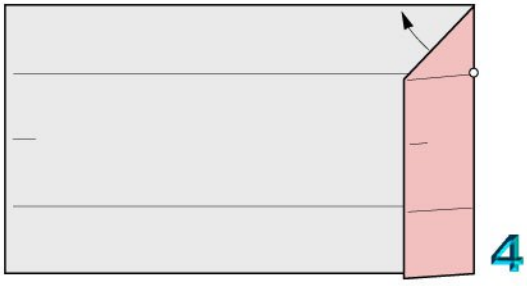
Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 longitudinali



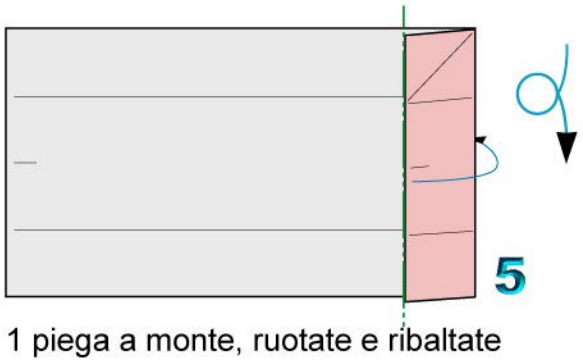
1 piega a bisettrice a valle e ruotate



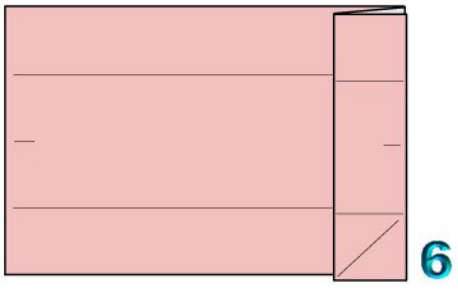
1 piega a valle e ruotate



Estraete il triangolo interno

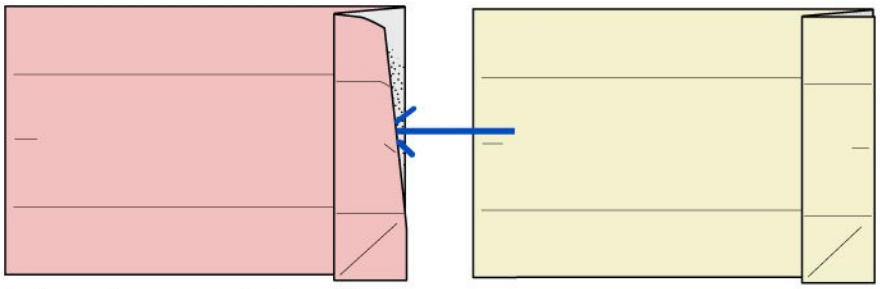


1 piega a monte, ruotate e ribaltate



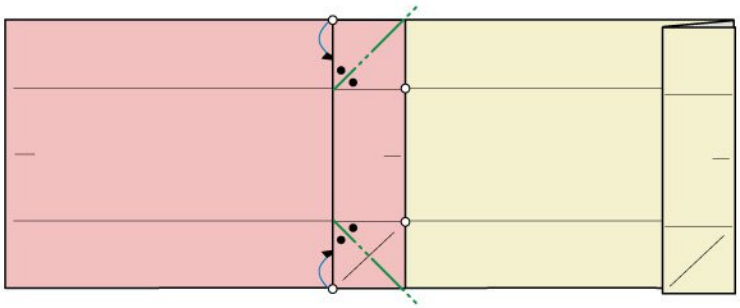
modulo ultimato

UNIONE DEI MODULI PER REALIZZARE
UN PANNELLO SOLAIO O TETTO



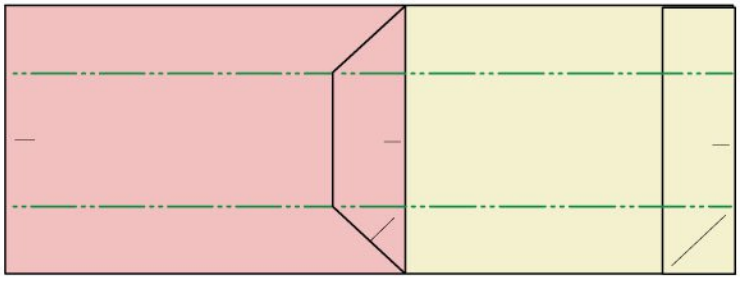
1

Intascate un modulo nell'altro



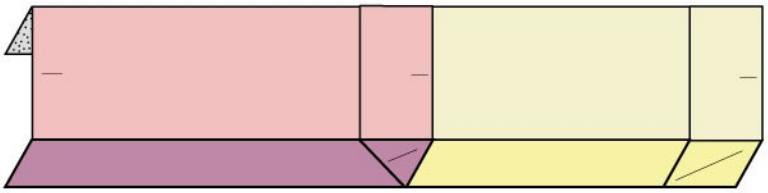
2

2 pieghe bisettrici a monte e ruotate bloccando l'unione



3

Ripiegando a monte modellate 3D



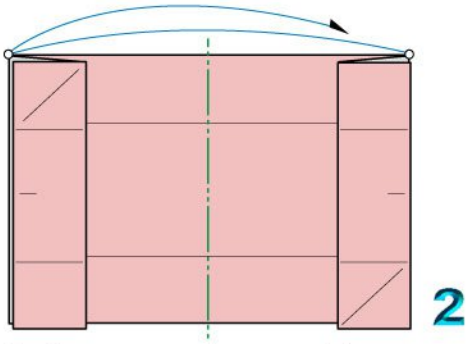
4

Unione di 2 moduli ultimata

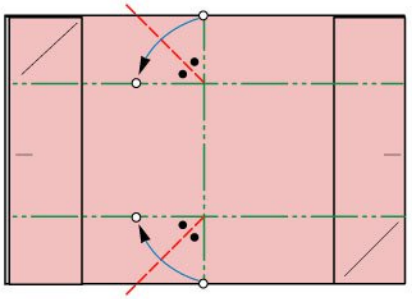
COSTRUZIONE DI UN MODULO COLMO DI UN TETTO



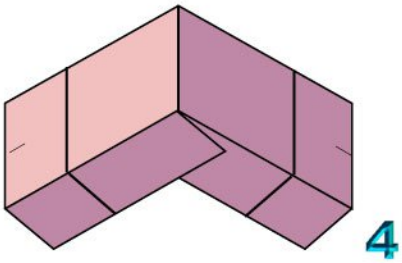
Partite dal modulo base e realizzate una tasca anche all'altra estremità



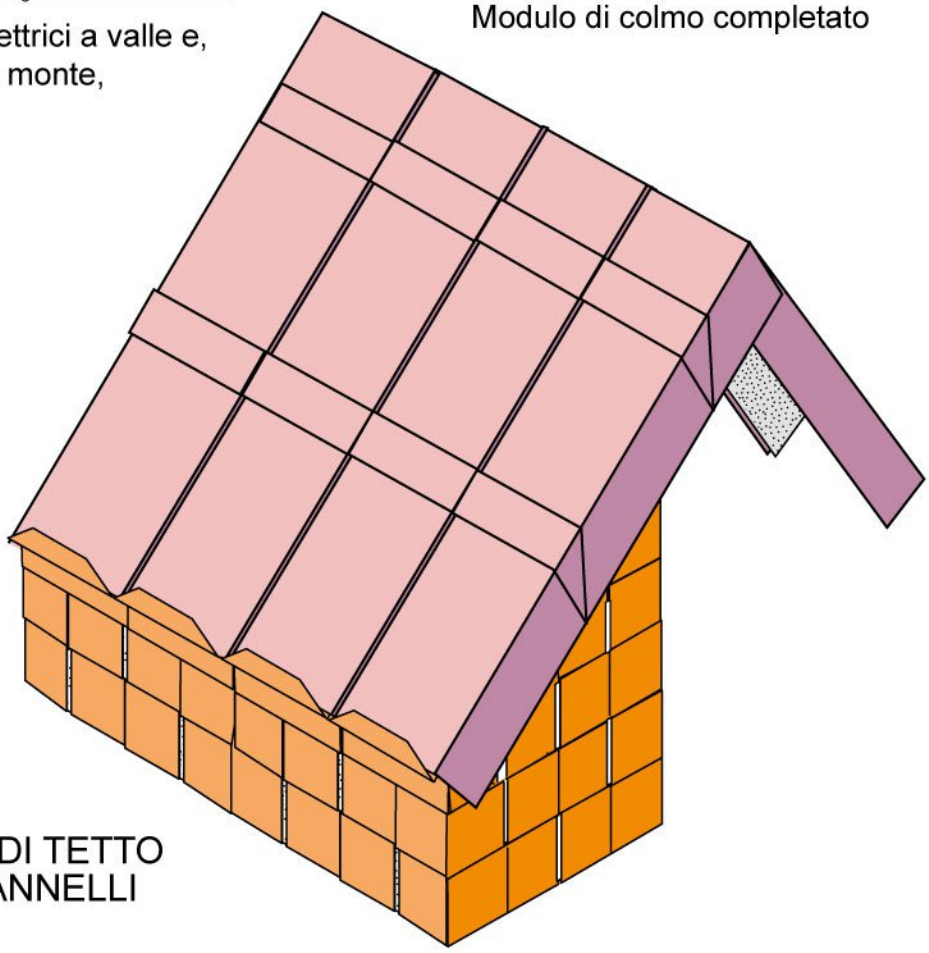
1 piega a monte e ruotate



2 pieghe bisettrici a valle e, ripiegando a monte, ruotate 3D



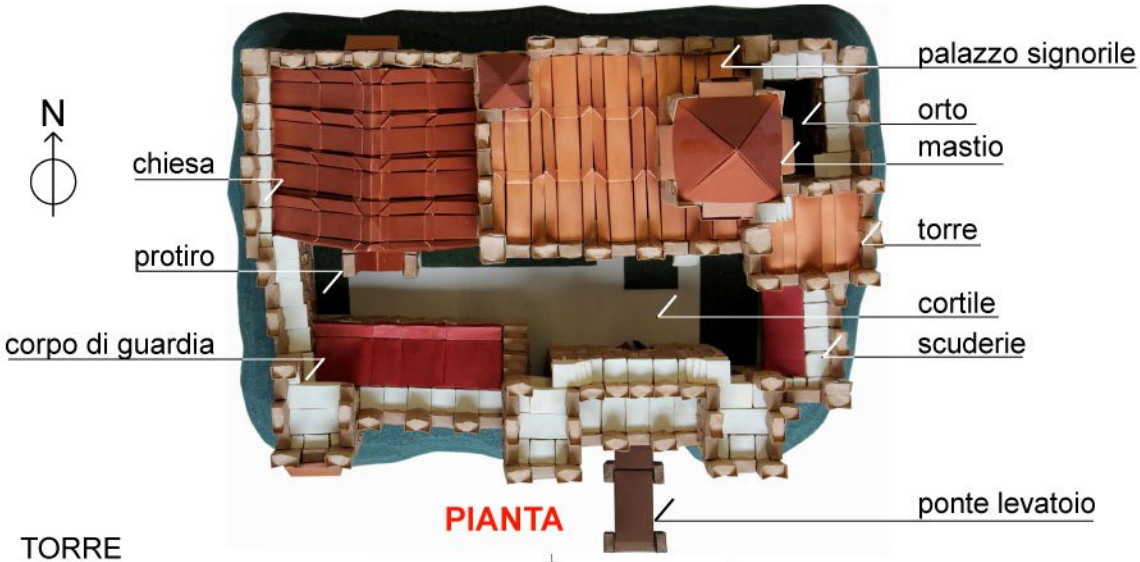
Modulo di colmo completato



ESEMPIO DI TETTO CON 4 PANNELLI

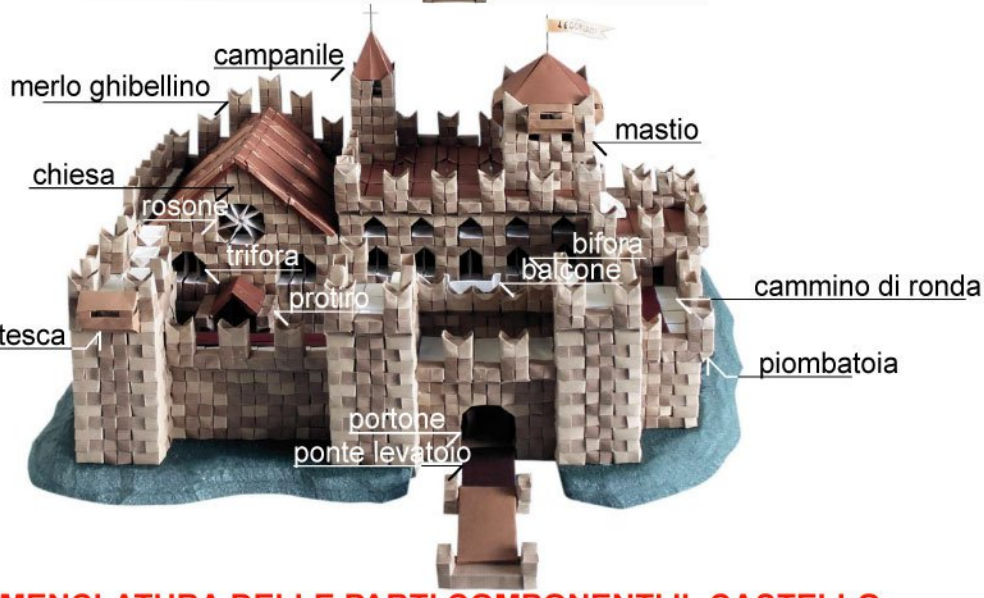
CASTELLO MEDIOEVALE





PIANTA

TORRE



NOMENCLATURA DELLE PARTI COMPONENTI IL CASTELLO



PROSPETTO SUD



PROSPETTO OVEST



PROSPETTO EST



PROSPETTO NORD

COLONNA

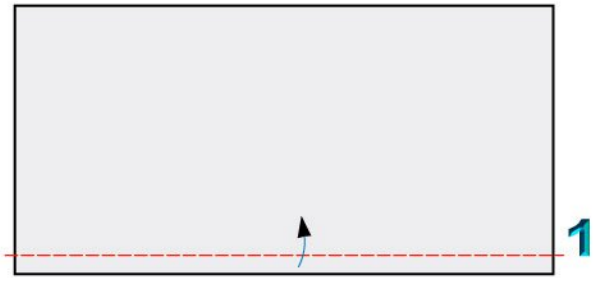
Elemento architettonico fondamentale dell'architettura classica, utilizzato fino ad un secolo fa per la costruzione di chiese, ville e palazzi, composto solitamente 3 parti: base, fusto e capitello.

Sono necessari 3 fogli rettangolari ed 1 quadrato per realizzare il fusto.

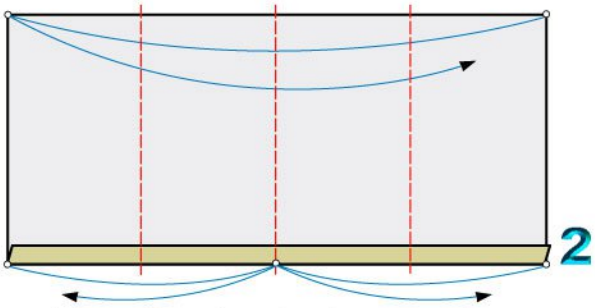
Si simula la costruzione di un tempio romano di ordine corinzio.

COSTRUZIONE DELLA BASE

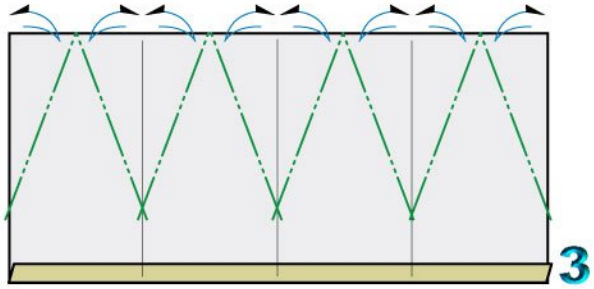
Con un foglio rettangolare si costruisce uno scheletro centrale da incastrare in un modulo A1, precedentemente preparato



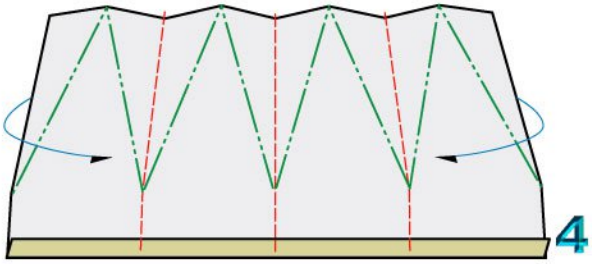
1 piega a valle e ruotate



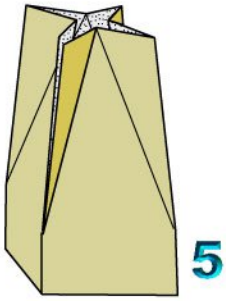
Eseguite prima la piega a valle centrale e poi le altre 2 trasversali



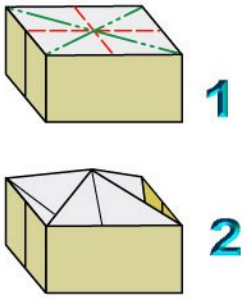
Eseguite 8 pieghe a monte in successione



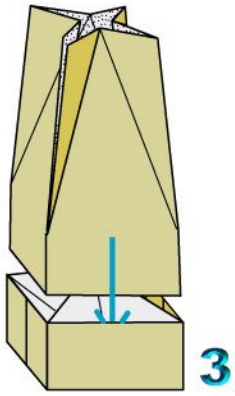
Ripiegando a valle ed a monte ruotate 3D



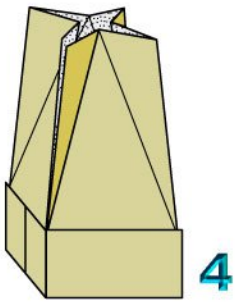
Questa specie di piramide, che farà da scheletro alla colonna, deve essere inserita in un modulo A1 modificato



Prendete un modulo A1 e, mediante 2 pieghe a valle e 2 a monte sollevatene il centro

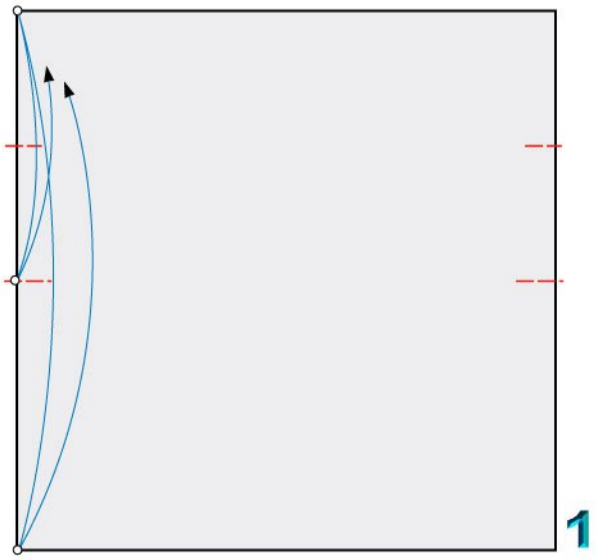


Inserite la specie di piramide nel modulo A1 modificato

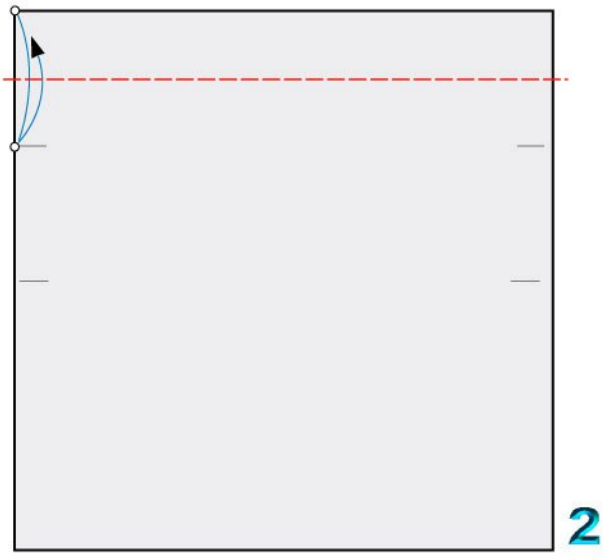


BASE della colonna ultimata

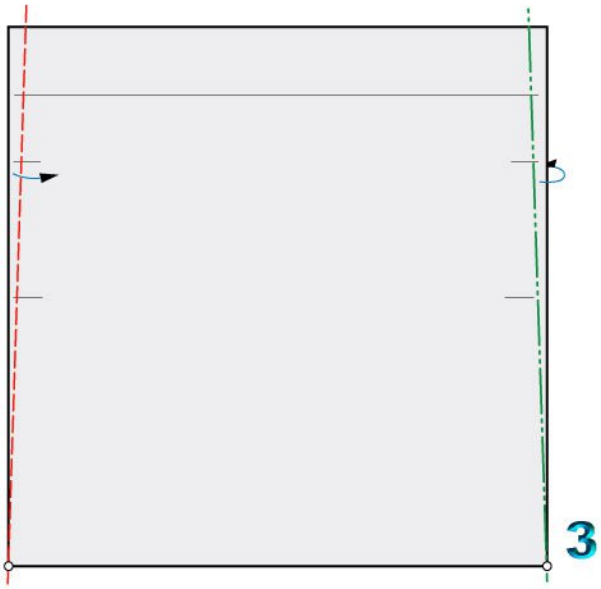
COSTRUZIONE DEL FUSTO



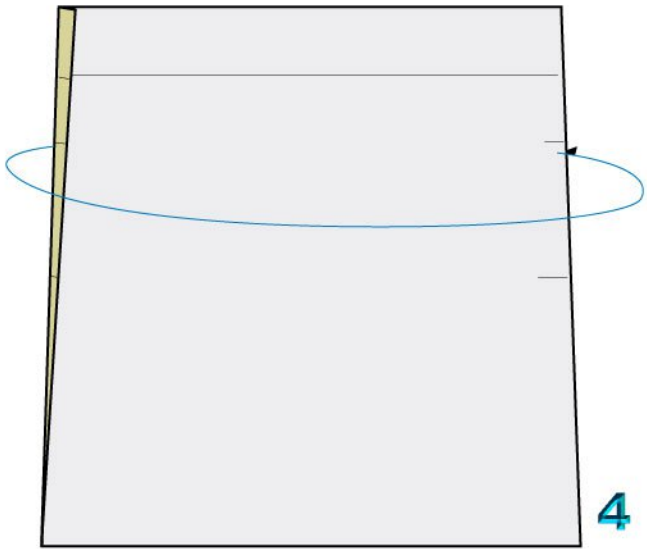
4 piccole a valle partendo da quelle centrali



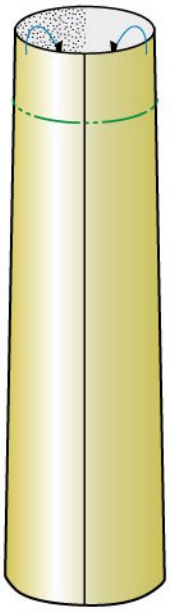
1 piega a valle



1 piega a valle ed una a monte

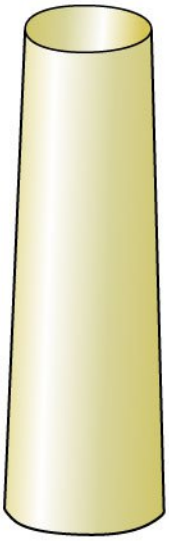


Ruotate agganciando



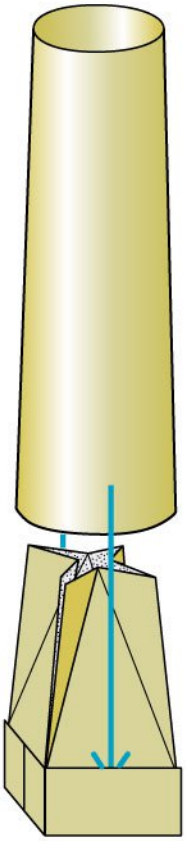
5

1 piega a monte, rovesciate all'interno e ribaltate per nascondere la giunzione



6

Fusto ultimato



7

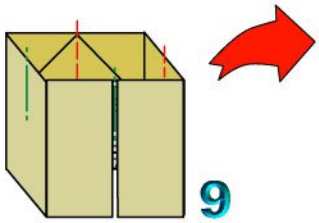
Avvolgendo il fusto sullo scheletro inseritelo nella base



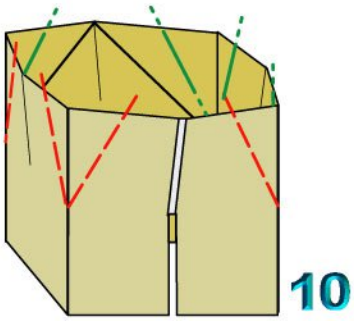
8

Fusto più basamento ultimati

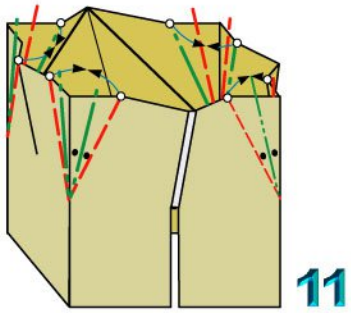
COSTRUZIONE DEL CAPITELLO



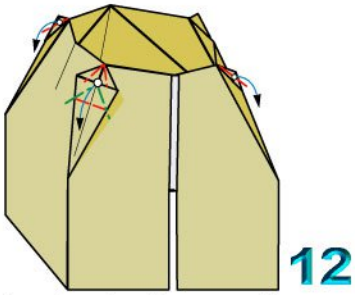
Partite da un modulo “A” rovesciato. Eseguite 1 piccola piega a monte al centro di ogni lato.



8 pieghe a valle, 2 per lato



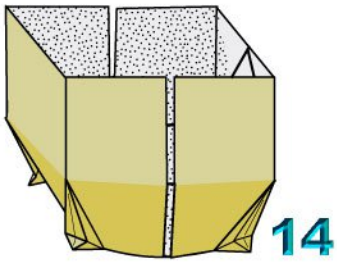
8 pieghe bisettrici a monte, 2 per lato e ruotate ripiegando a valle.



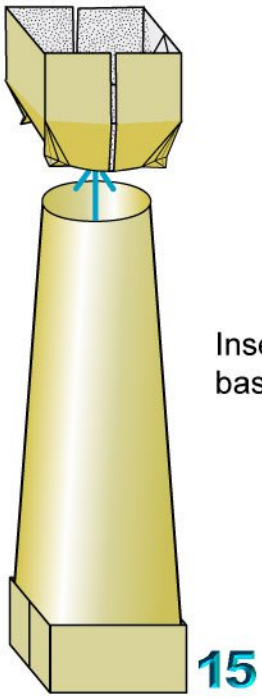
3 piccole pieghe a valle e 2 a monte per spigolo e ruotate



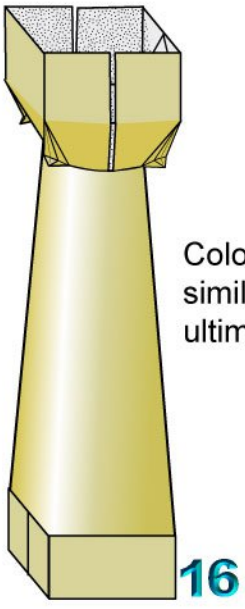
Ribaltate



Capitello ultimato

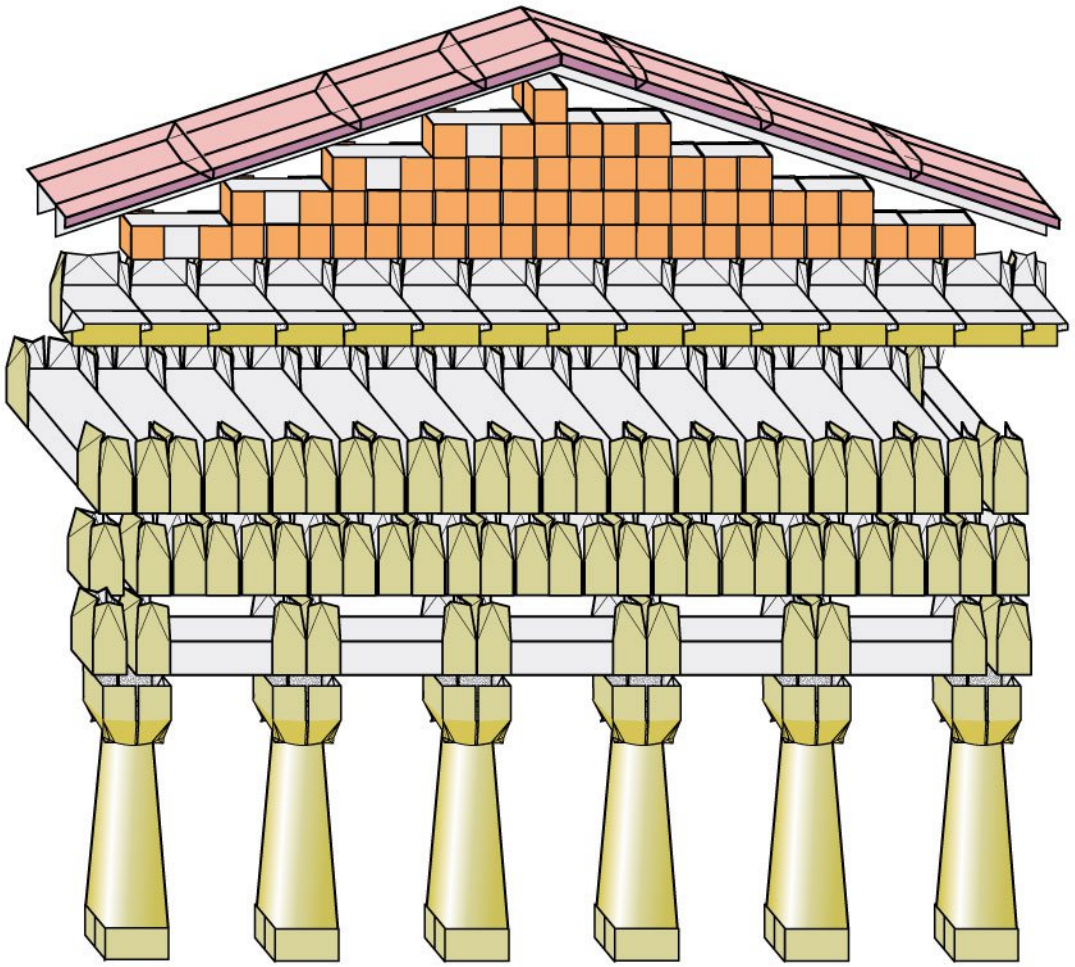


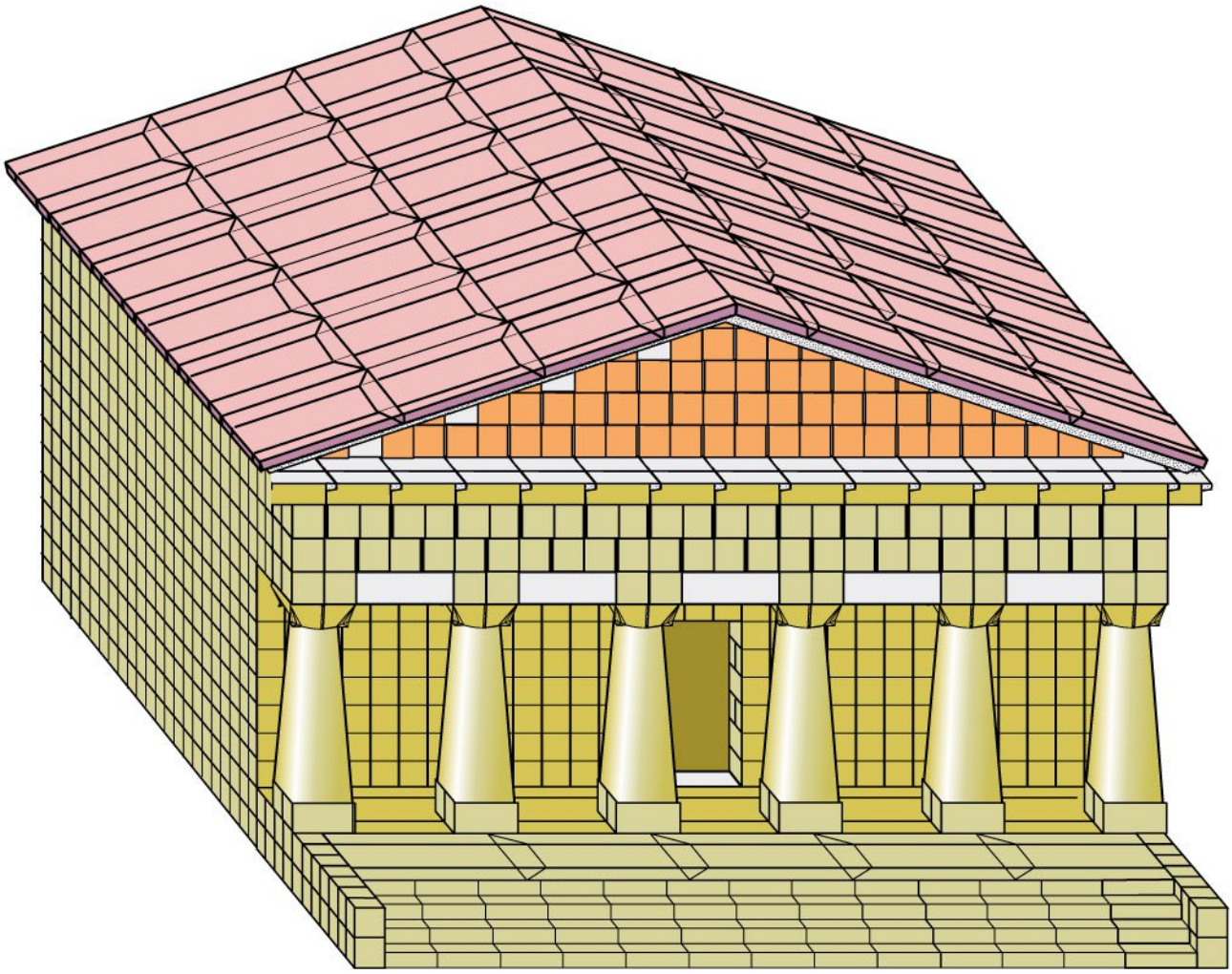
Inserite il fusto con base nel capitello



Colonna simil-corinzia ultimata

COSTRUZIONE DI UN TEMPIO ROMANO CORINZIO ESASTILO IN ANTIS





I TEMPLI ROMANI SI DISTINGUONO DA QUELLI GRECI PER LA PRESENZA DI SCALINATA SOLAMENTE IN POSIZIONE FRONTALE

PARETI CURVE

Le torri tonde nel progetto di un castello sostituiscono gradatamente quelle a pianta rettangolare in risposta al perfezionamento delle bocche da fuoco (sec.XIV).

Infatti una parete curva, più laboriosa da costruire, offre una resistenza maggiore all'ariete ed alle cannonate e può anche far deviare proiettili non centrati.

Nell'architettura civile spazi semicircolari sormontati da semicupole, chiamati "esedre", furono inseriti dai romani nelle loro basiliche, che erano edifici pubblici e tribunali.

Le esedre si trasformarono in absidi e cappelle nelle chiese romaniche.

L'argomento si sviluppa nei capitoli: -Blocco curvo
-Semiblocco curvo
-Cammino di ronda con piombatoie su pareti curve





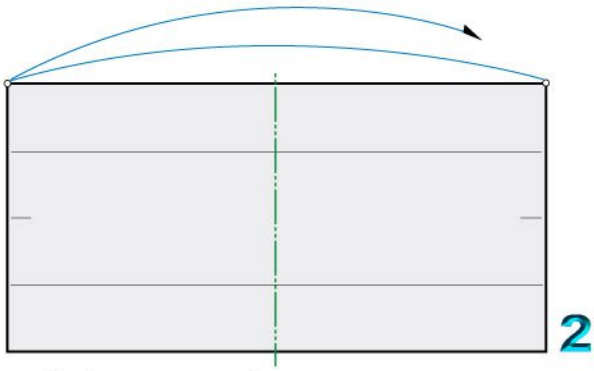
D_1-BLOCCO CURVO

Modificando il blocco base A si ottiene un blocco idoneo per costruire torri tonde o absidi di chiese.
Nel primo caso è necessario modificare anche il cammino di ronda, nel secondo bisogna studiare un apposito sistema di copertura.

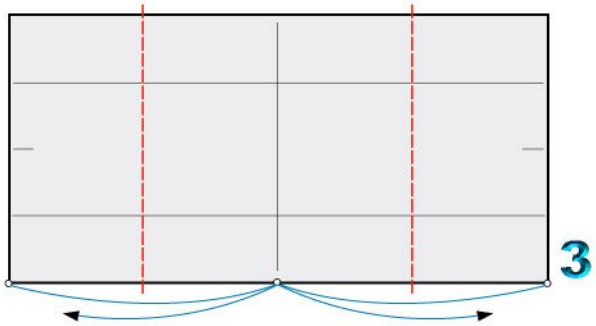
COSTRUZIONE DEL BLOCCO CURVO



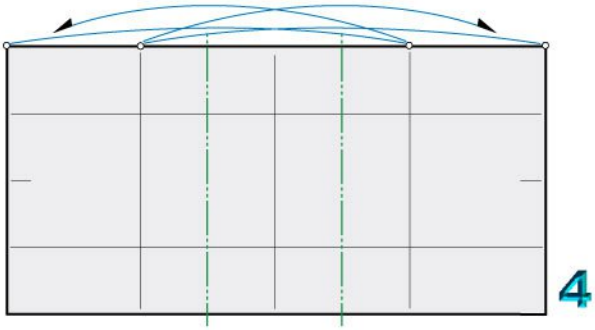
Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 longitudinali



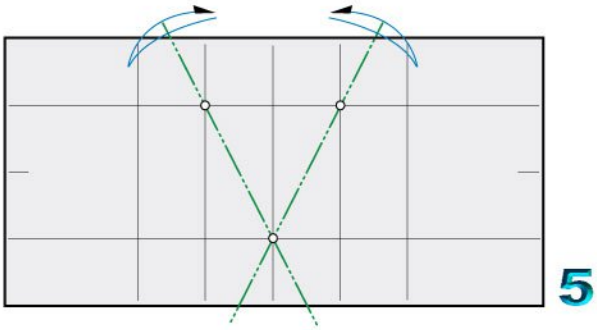
1 piega a monte



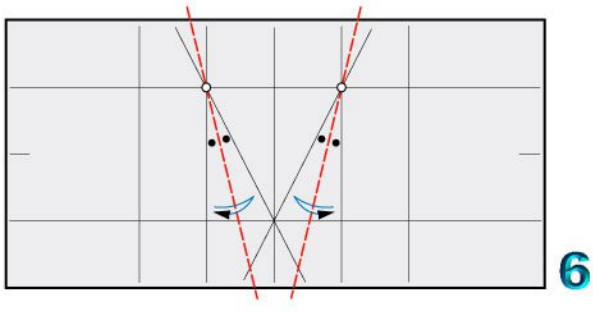
2 pieghe a valle



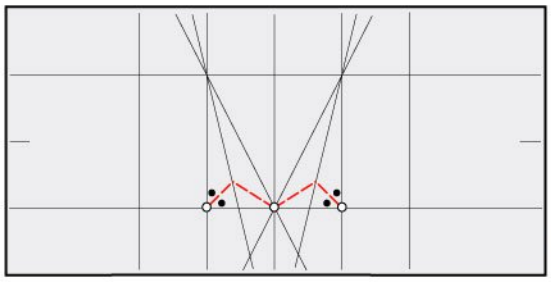
2 pieghe a monte



2 pieghe a monte. Queste, e quelle dei passaggi n. 6 e 7 costituiscono delle pre-piegature per condizionare la compattazione della carta di cui alla fig, n.17

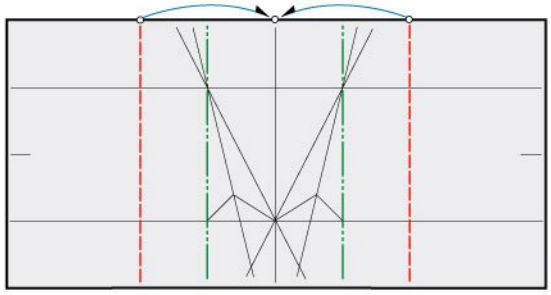


2 pieghe bisettrici a valle



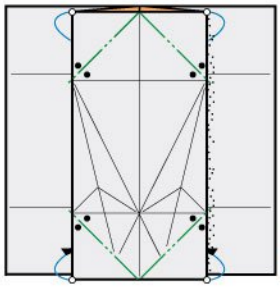
7

4 piccole pieghe a valle



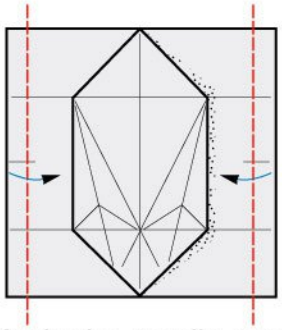
8

Ruotate ripiegando a valle ed a monte



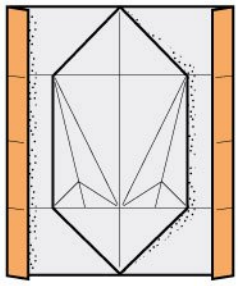
9

4 pieghe a monte e ruotate



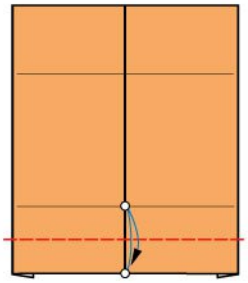
10

2 pieghe a valle e ruotate



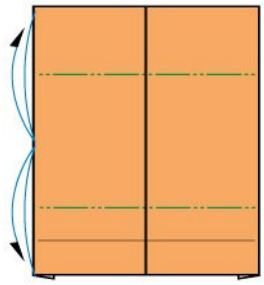
11

Ribaltate



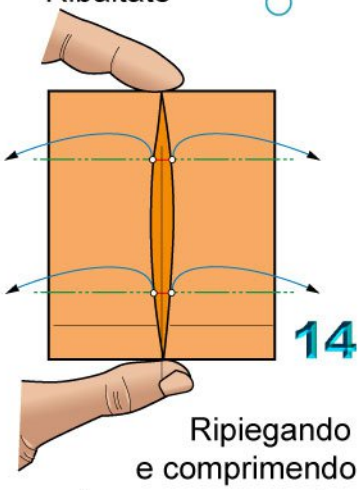
12

1 piega a valle



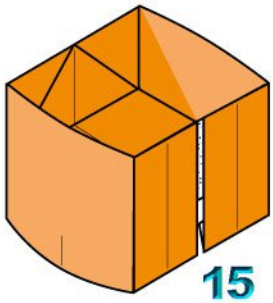
13

Ripiegate 2 volte a monte



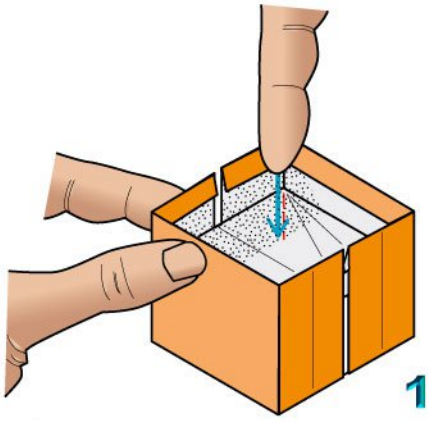
14

Ripiegando
e comprimendo
contemporaneamente,
aprite modellando 3D



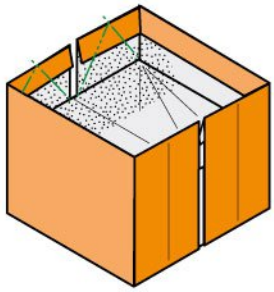
15

Ribaltate

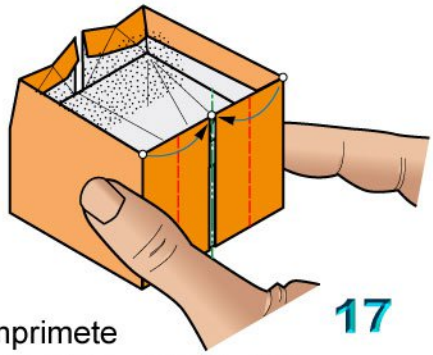


16

Comprimete gli spigoli e fate
rientrare leggermente il fondo

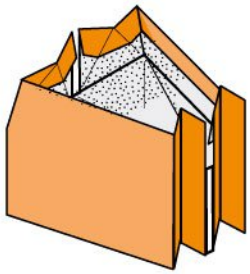


4 pieghe a monte



17

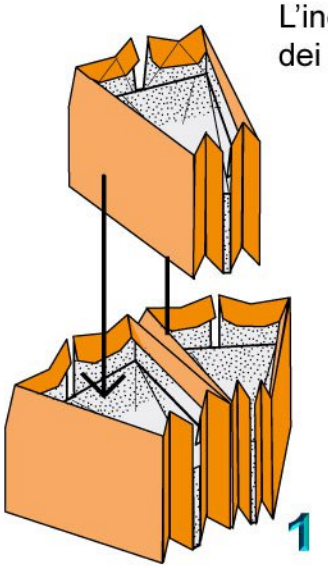
Comprimete
ripiegando a valle 2 volte



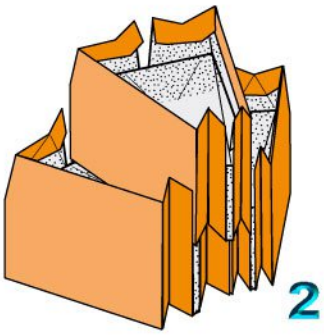
18

Blocco curvo ultimato

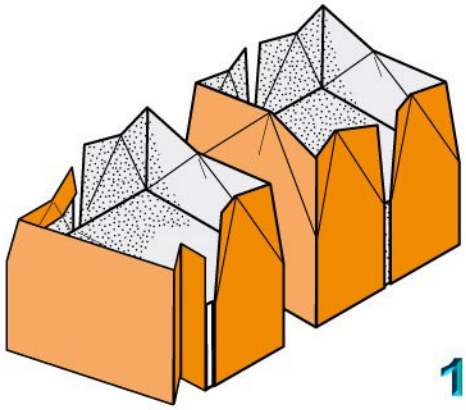
ESEMPIO DI UNIONE DI 3 BLOCCHI CURVI
L'incastro avviene in modo analogo a quello
dei blocchi "A"



1

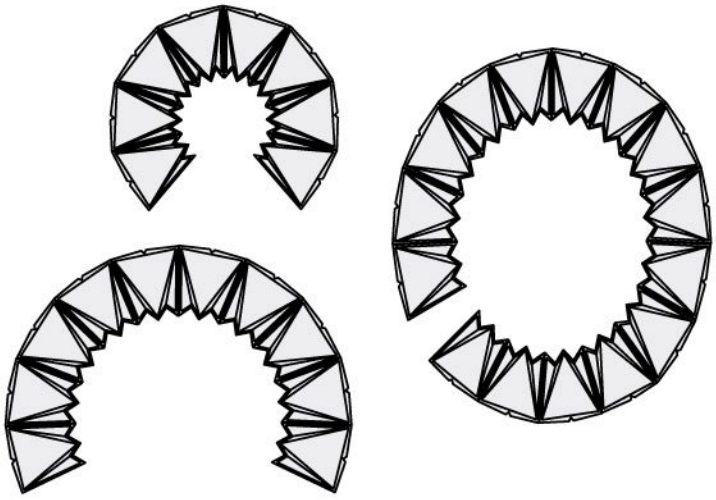


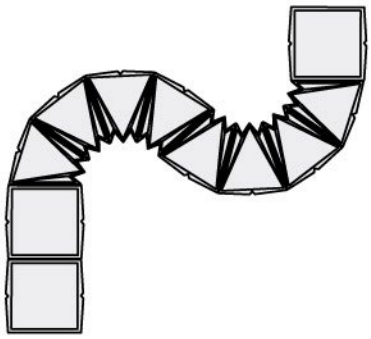
2



1

Per eseguire un raccordo tra un muro dritto ed uno curvo modificate il blocco "A " solo nella metà a contatto con quest'ultimo





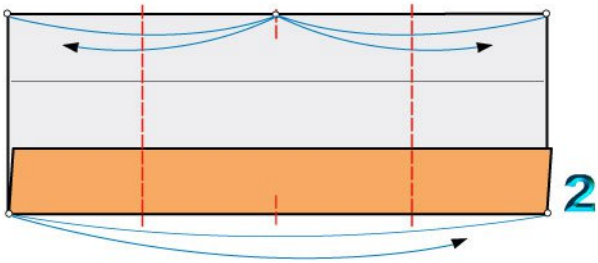
Variando la compressione del blocco si agisce sull'angolo formato dai fianchi; in questo modo si possono ottenere muri tondi , elissoidali, raccordi con il blocco base "A" ecc.

D_2-SEMIBLOCCO CURVO

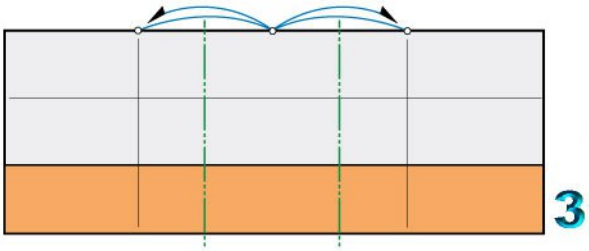
Questo blocco serve principalmente per eseguire muri di testa o finestrature.
Dopo aver ridotto la larghezza del rettangolo iniziale, la costruzione inizialmente è uguale a quella del blocco A.



3 pieghe a valle e ruotate il bordo inferiore



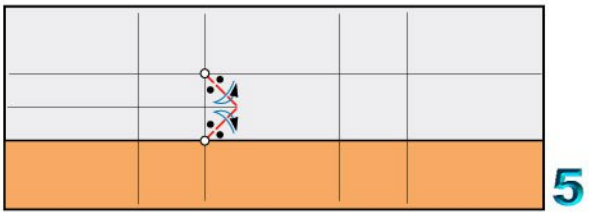
Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 trasversali



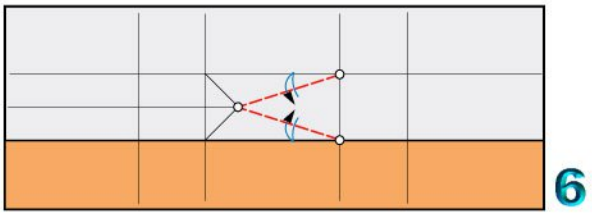
2 pieghe a monte



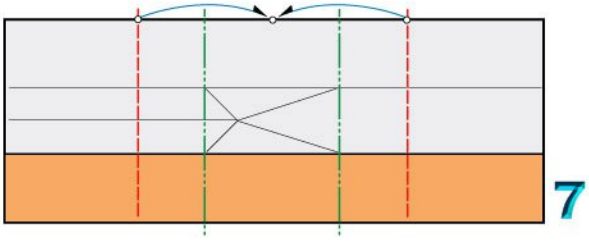
1 piega a monte



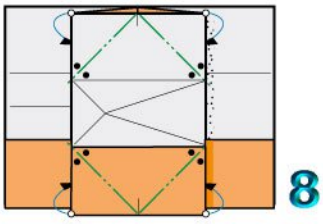
2 piccole pieghe bisettrici a valle



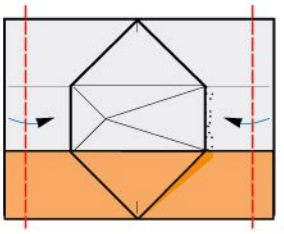
2 pieghe a valle



Ruotate ripiegando a valle ed a monte

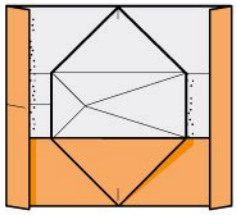


4 pieghe bisettrici a monte e ruotate



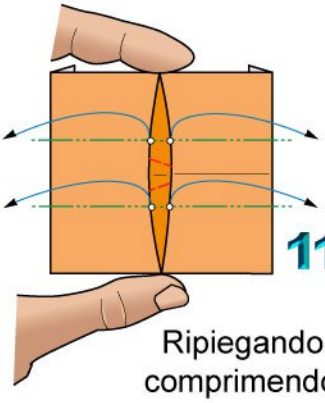
9

2 pieghe a valle e ruotate



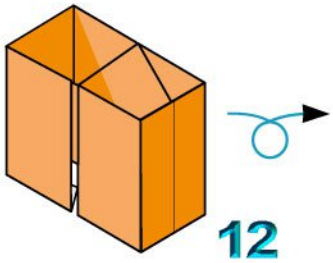
10

Ribaltate



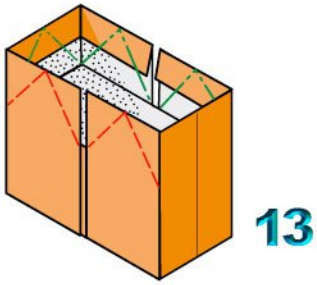
11

Ripiegando e comprimendo contemporaneamente, aprite modellando 3D



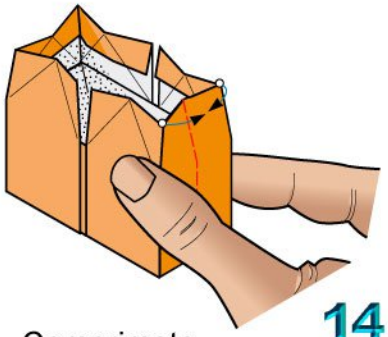
12

Ribaltate



13

Diminuite il perimetro del bordo superiore



14

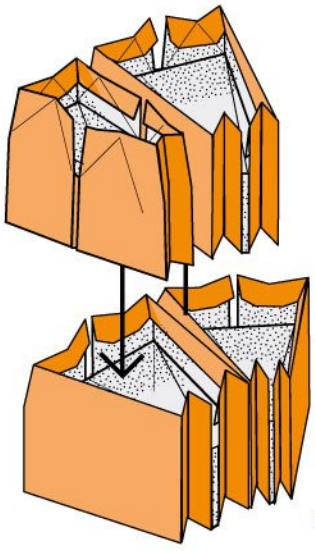
Comprimete



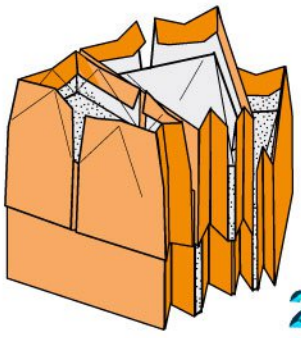
15

Semiblocco D2 ultimato

ESEMPIO DI MURO DI TESTA FORMATO DA 3 BLOCCHI D1 E 1 SEMIBLOCCO D2



1

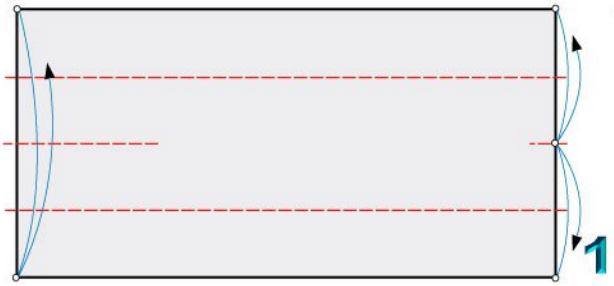


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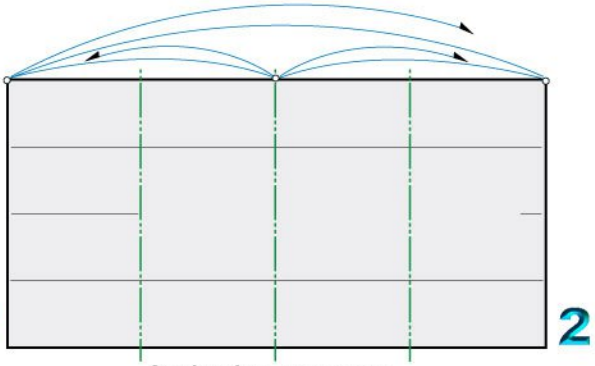
CAMMINO DI RONDA CON PIOMBATOIE SU PARETI CURVE

Per costruire un cammino di ronda con piombatoie su pareti curve bisogna realizzare 4 tipi di modulo: blocco base , semiblocco base, parapetto, elemento di copertura.

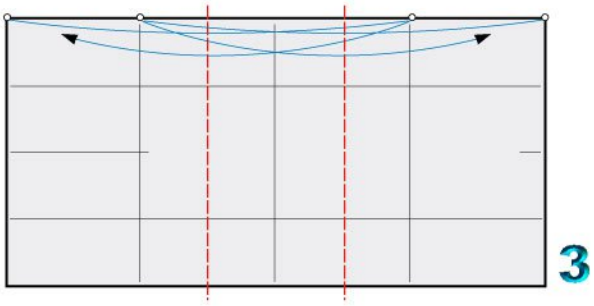
COSTRUZIONE DEL BLOCCO BASE



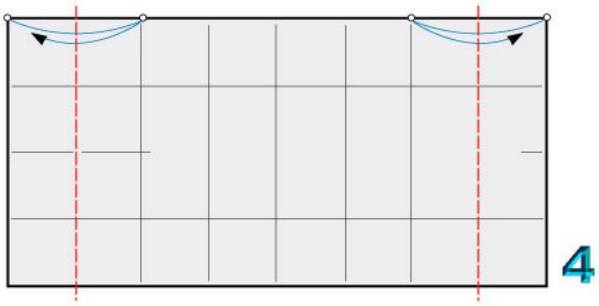
Eseguite prima le 2 piccole pieghe a valle centrali e poi le altre 2 longitudinali



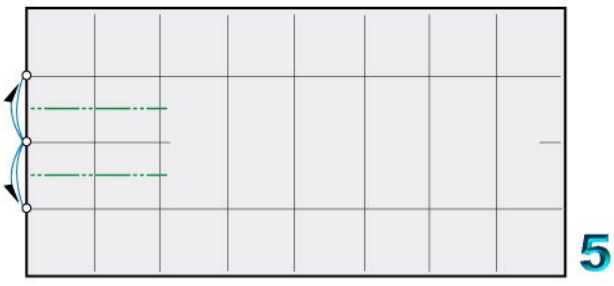
3 pieghe a monte



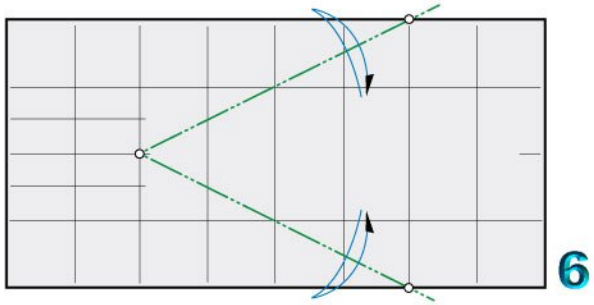
2 pieghe a valle



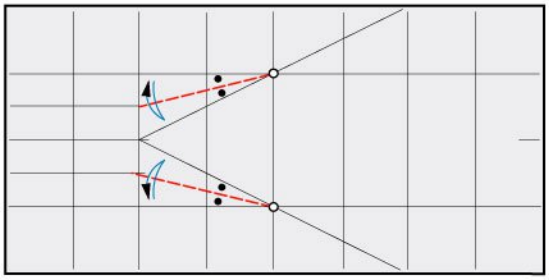
2 pieghe a valle



2 pieghe a monte

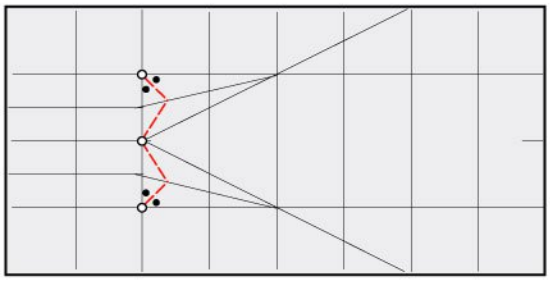


2 pieghe a monte



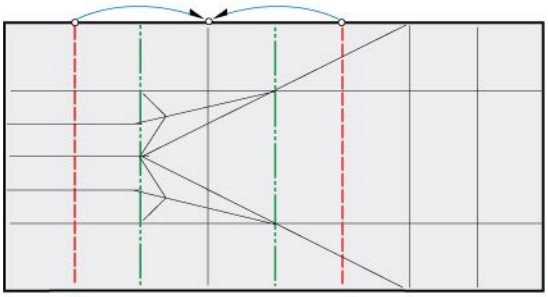
7

2 pieghe a valle



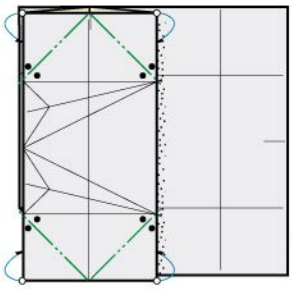
8

4 piccole pieghe a valle



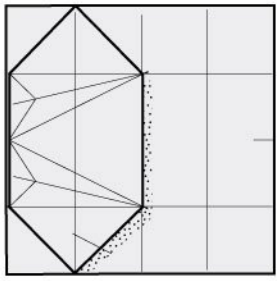
9

Ruotate ripiegando
a valle ed a monte



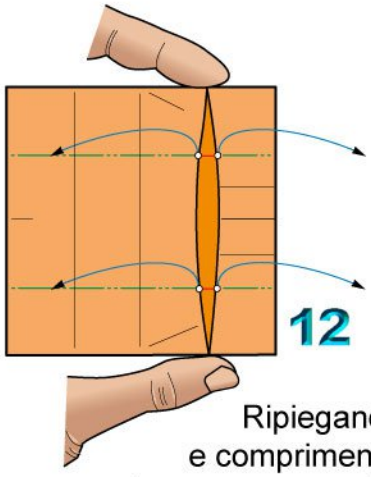
10

4 pieghe bisettrici a monte
e ruotate all'interno



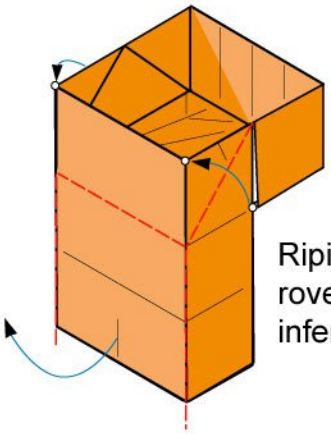
11

Ribaltate



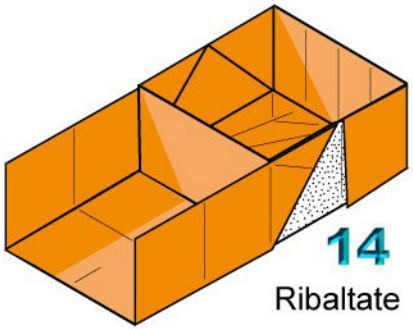
12

Ripiegando
e comprimendo
contemporaneamente,
aprite modellando 3D



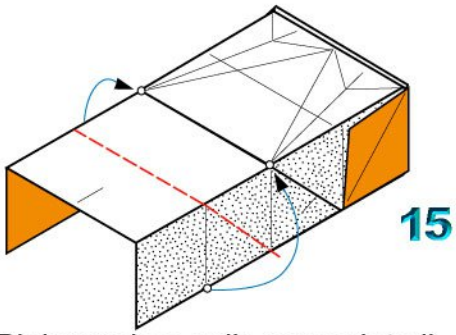
13

Ripiegando a valle
rovesciate il bordo
inferiore modellando
3D

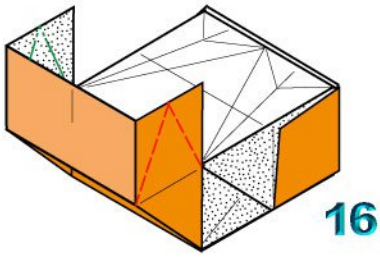


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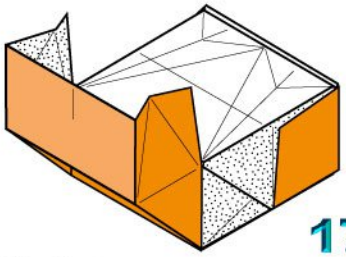
Ribaltate



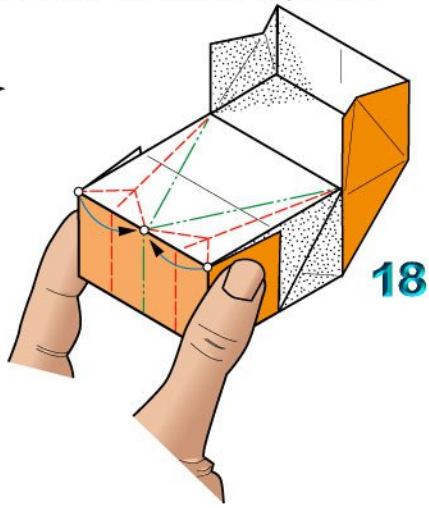
Ripiegando a valle rovesciate il bordo inferiore modellando 3D



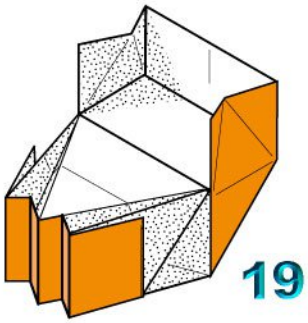
Con una serie di pieghe a valle restringete il perimetro del bordo superiore



Ribaltate



Comprimete facendo rientrare la carta in corrispondenza delle pieghe a valle

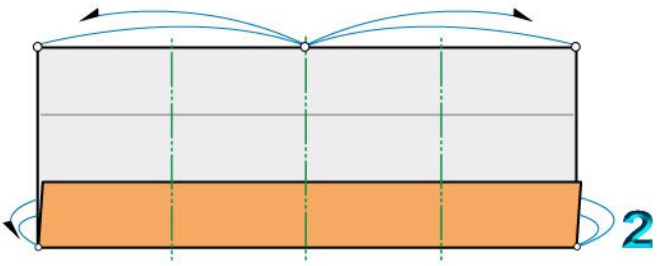


Blocco curvo ultimato

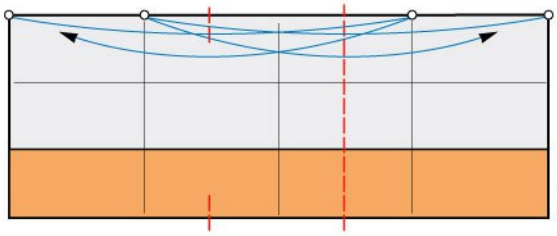
COSTRUZIONE DEL SEMIBLOCCO BASE



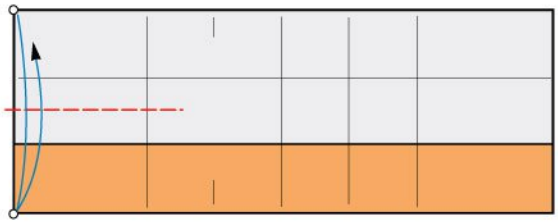
3 pieghe a valle e ruotate il bordo inferiore



3 pieghe a monte



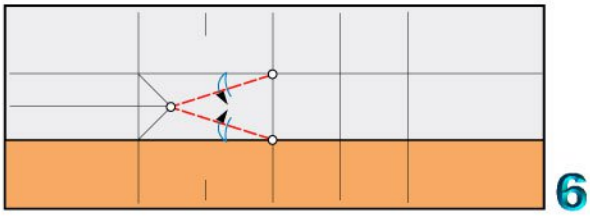
1 piega a valle e 2 piccole



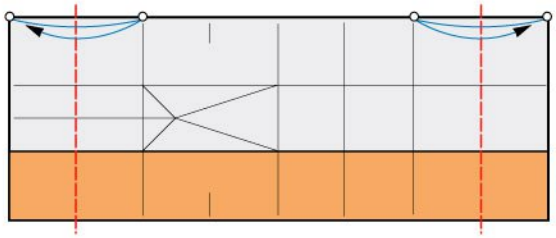
1 piega a valle



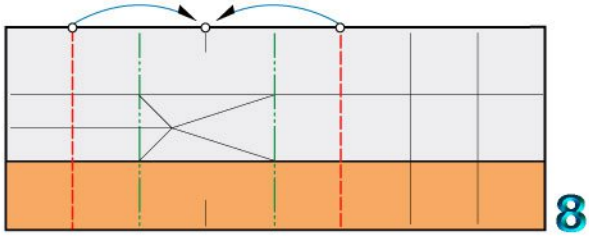
2 piccole pieghe bisettrici a valle



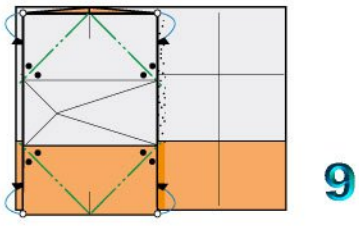
2 pieghe a valle



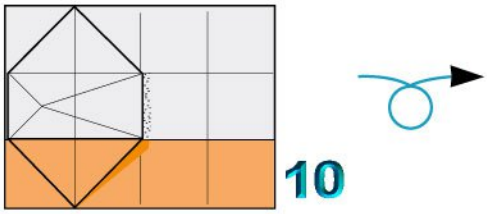
2 pieghe a valle



Ruotate ripiegando a valle ed a monte

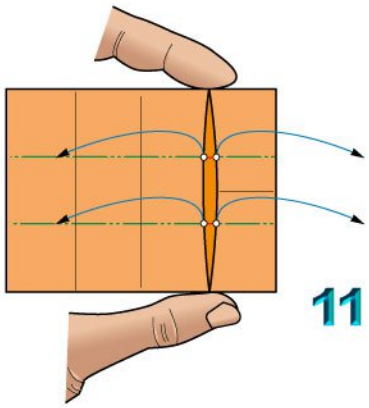


4 pieghe bisettrici a monte e ruotate

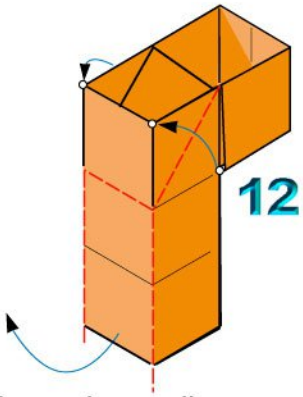


Ribaltate

Ripiegando
e comprimendo
contemporaneamente,
aprite modellando 3D

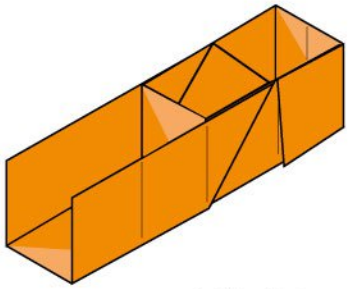


11



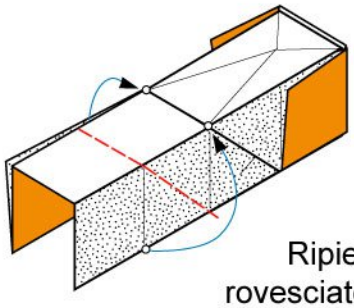
12

Ripiegando a valle rovesciate il
bordo inferiore modellando 3D



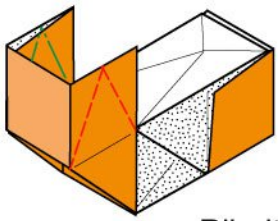
13

Ribaltate



14

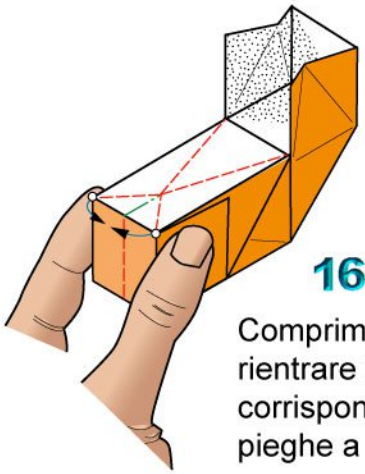
Ripiegando a valle
rovesciate 3D il bordo indicato



15

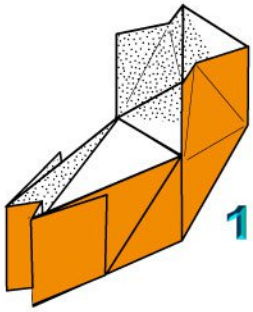


Ribaltate



16

Comprimete facendo
rientrare la carta in
corrispondenza delle
pieghe a valle

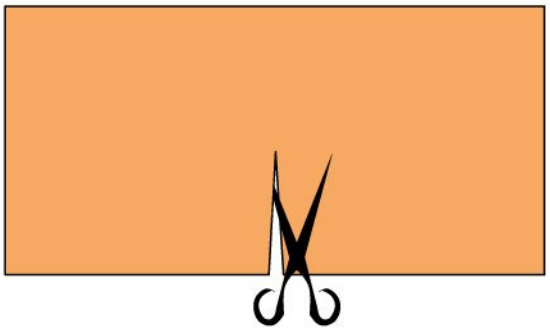


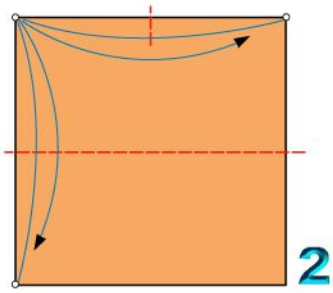
17

Blocco curvo per
piombatoie ultimato

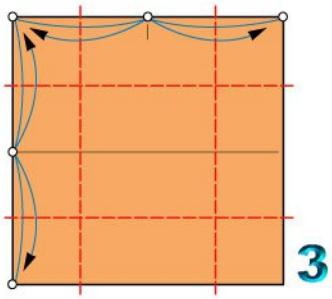
COSTRUZIONE DEL PARAPETTO

Dividete il quadrato base in 4 parti uguali

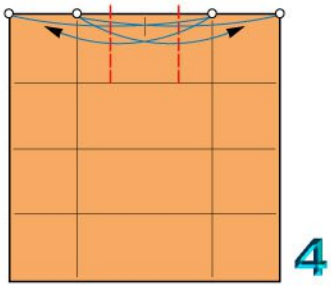




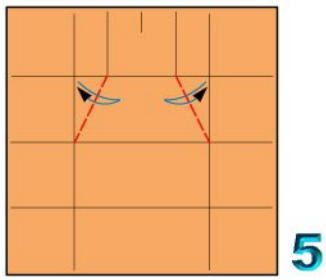
2 pieghe a valle, 1 grande ed 1 piccola



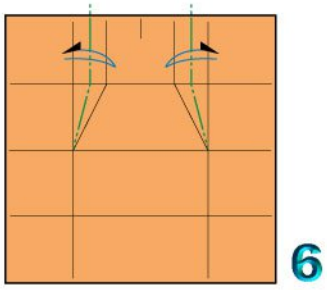
4 pieghe a valle



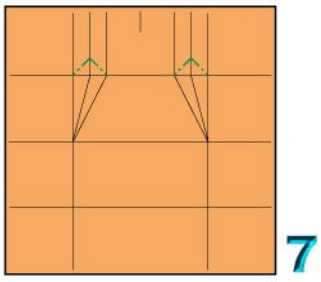
2 pieghe a valle



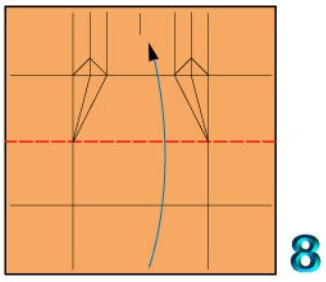
2 pieghe a valle



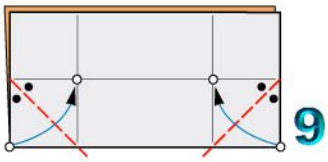
2 pieghe a monte



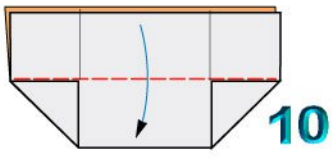
4 piccole pieghe a monte



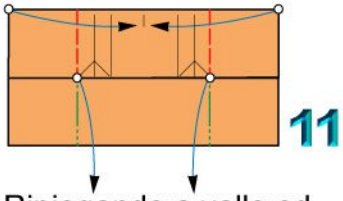
Ruotate ripiegando a valle



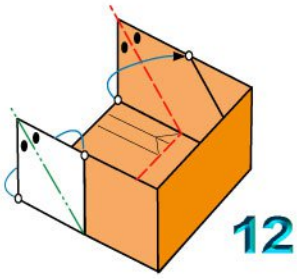
2 pieghe bisettrici a valle e ruotate



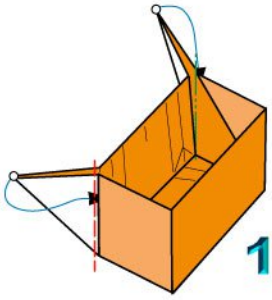
Ruotate ripiegando a valle



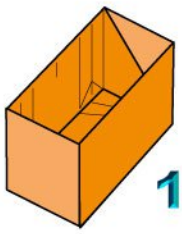
Ripiegando a valle ed a monte ruotate 3D



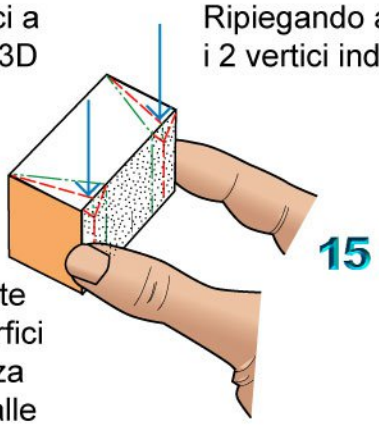
2 pieghe bisettrici a monte e ruotate 3D



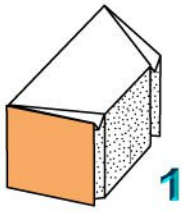
Ripiegando a valle intascate i 2 vertici indicati



Ribaltate

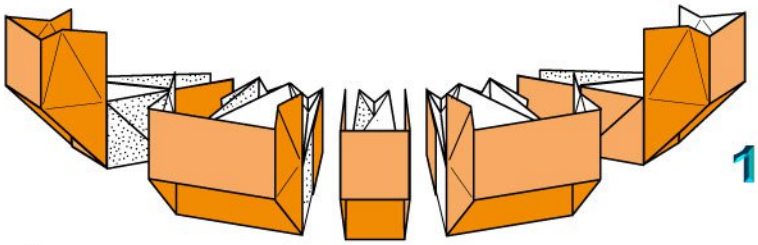


Comprimendo fate rientrare le superfici in corrispondenza delle pieghe a valle

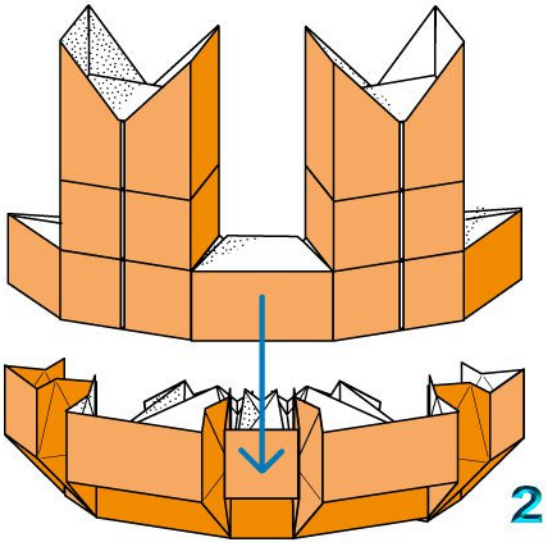


Parapetto ultimato

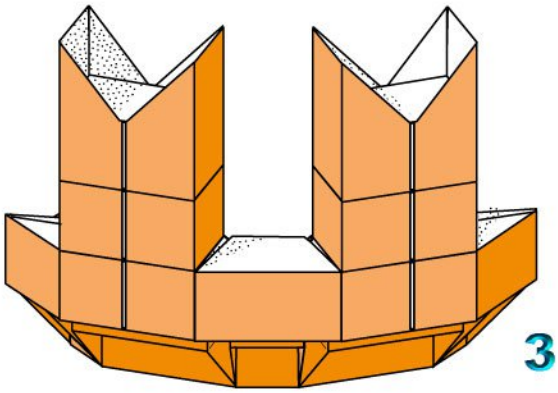
COSTRUZIONE DELLA MERLATURA CURVA



Unite alternativamente blocchi e semiblocchi base

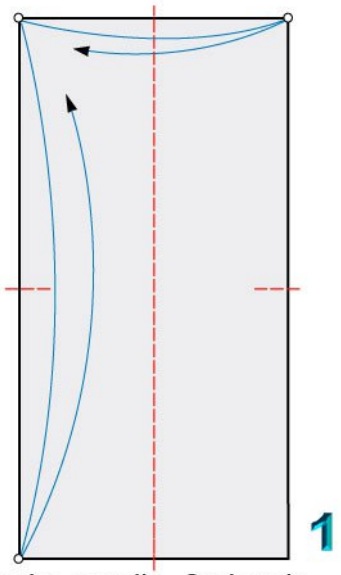


Sormontate i merli sui blocchi base ed i parapetti sui mezzi blocchi base

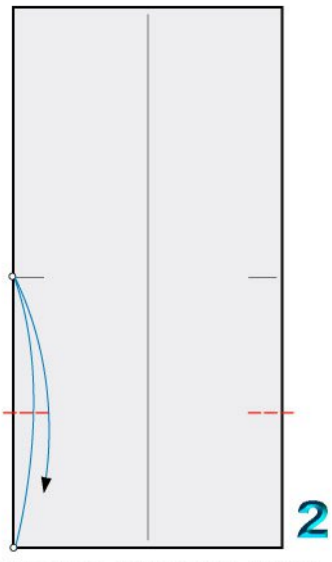


Merlatura ultimata

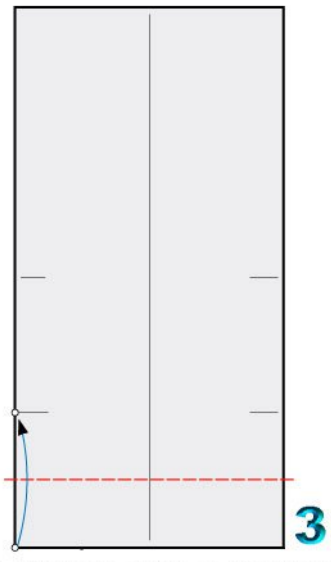
COSTRUZIONE DELL' ELEMENTO DI COPERTURA



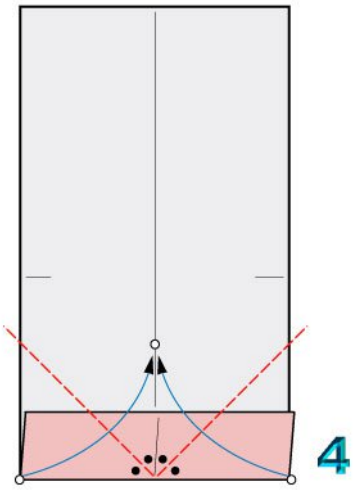
3 pieghe a valle, 2 piccole



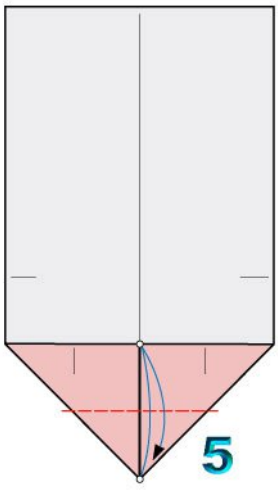
2 piccole pieghe a valle



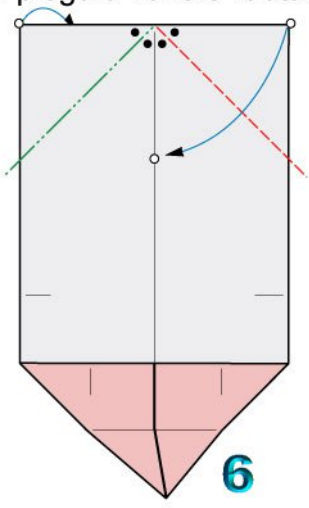
1 piega a valle e ruotate



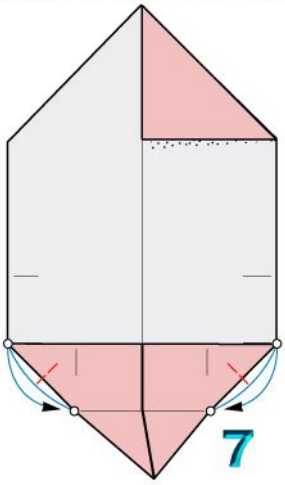
2 pieghe a valle e ruotate



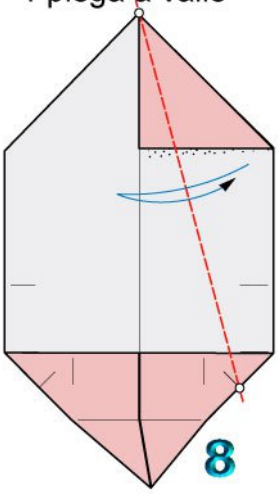
1 piega a valle



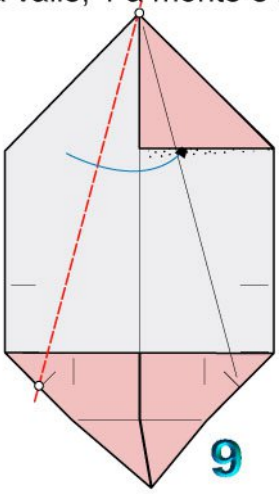
1 piega a valle, 1 a monte e ruotate



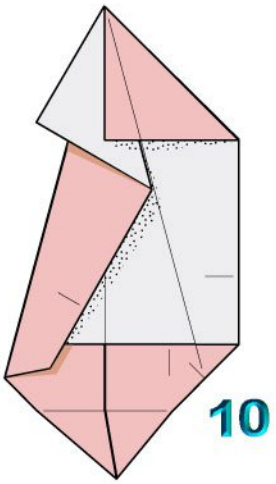
2 piccole pieghe a valle



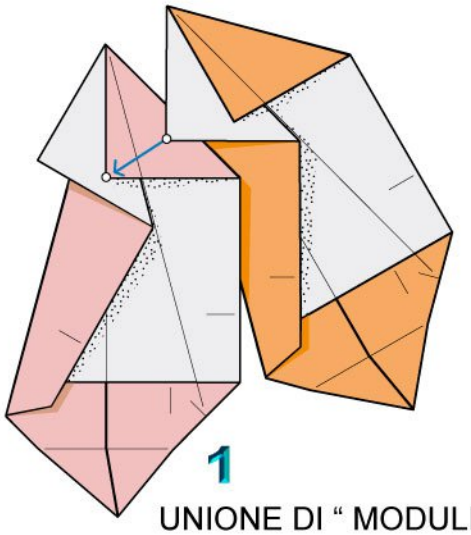
1 piega a valle



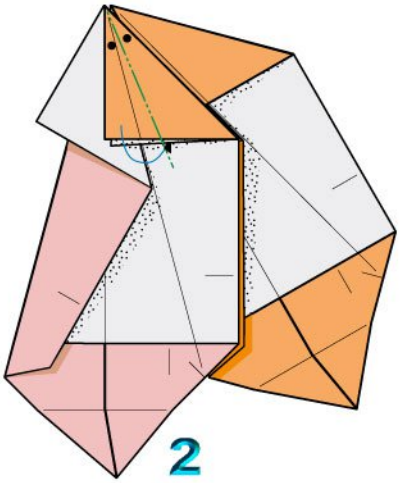
1 piega a valle ed intascate



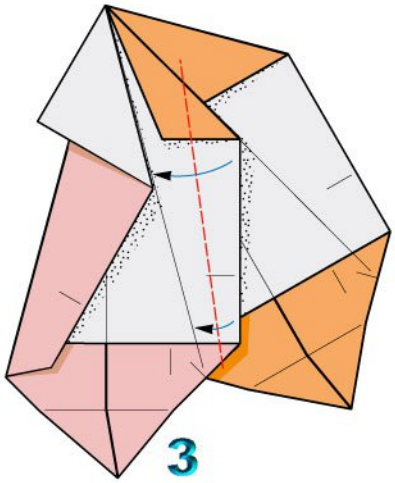
Modulo ultimato



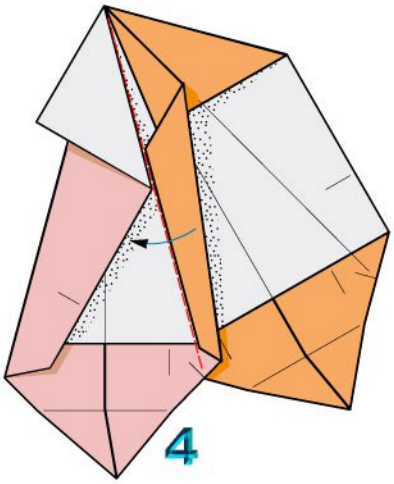
UNIONE DI " MODULI:
inserite uno nell'altro



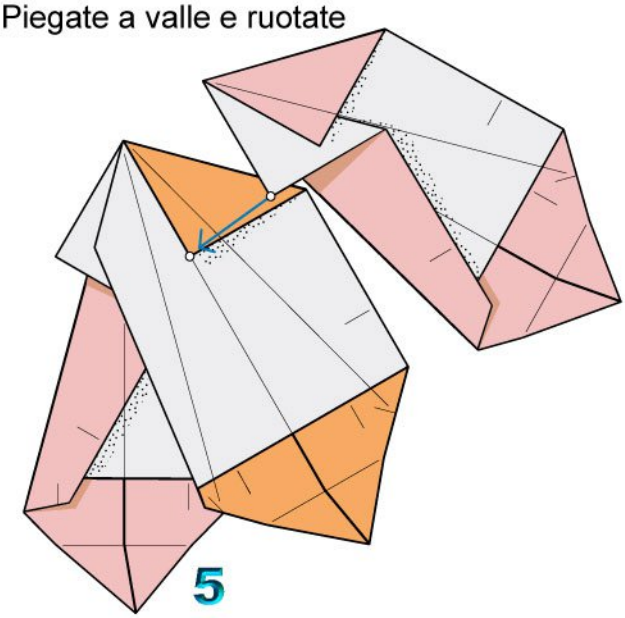
Piegate a monte e ruotate



Piegate a valle e ruotate



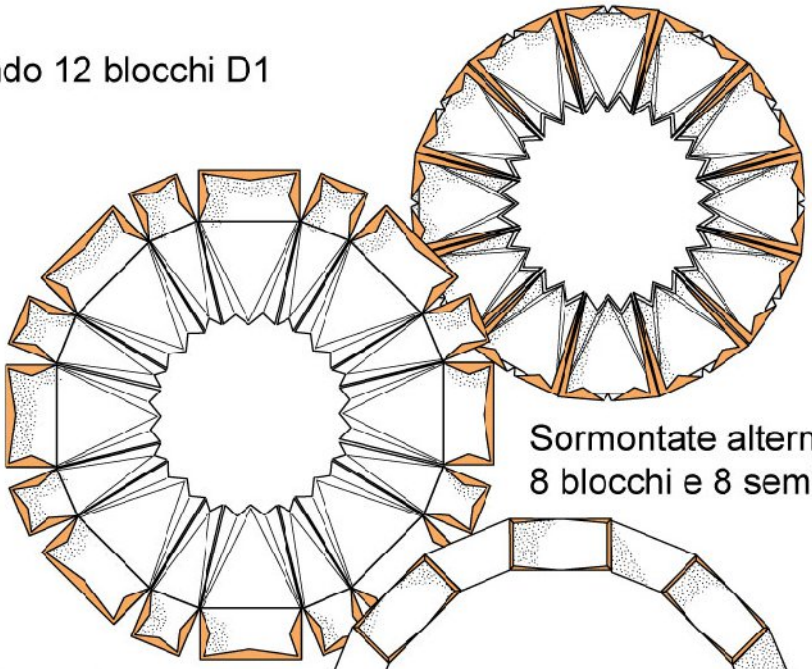
Ripiegando a valle ruotate



Ripetete l'operazione con un'altro modulo

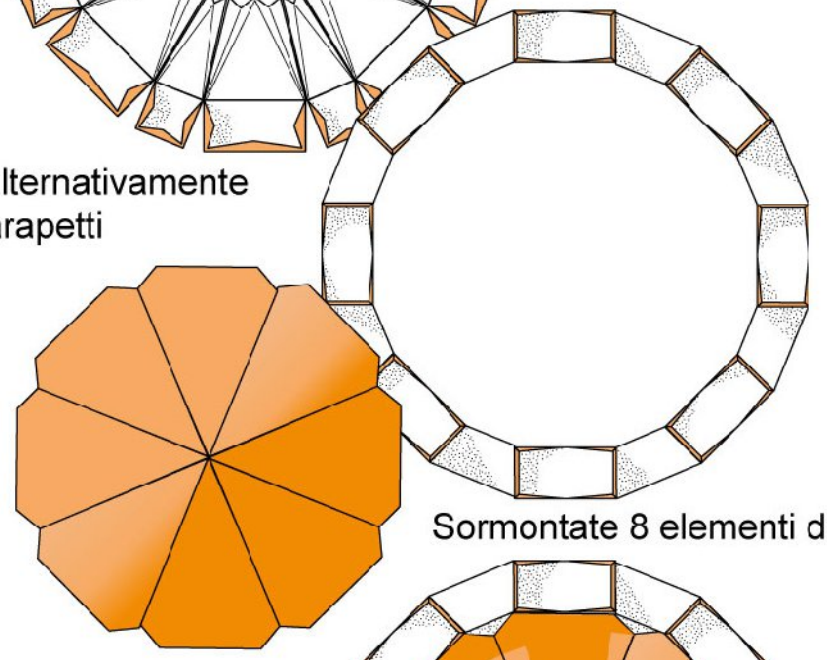
COSTRUZIONE DI UNA TORRE ESADECAGONALE

Partite unendo 12 blocchi D1

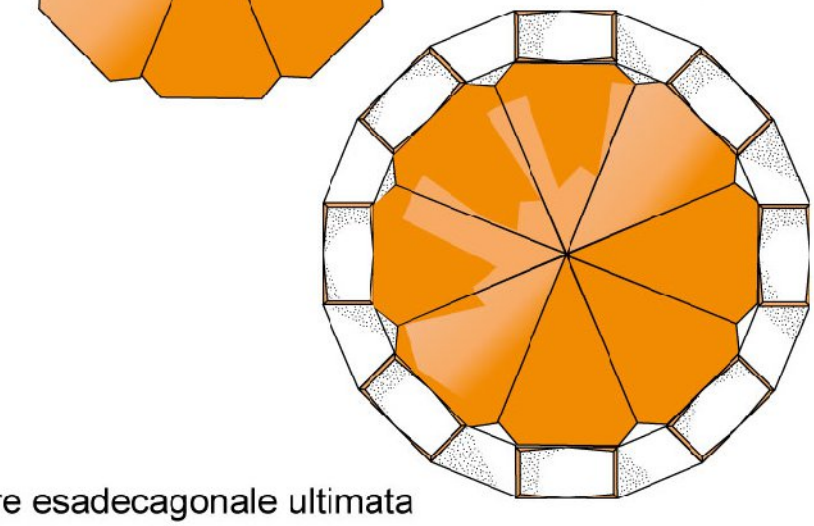


Sormontate alternativamente
8 blocchi e 8 semiblocchi base

Sormontate alternativamente
8 merli e 8 parapetti



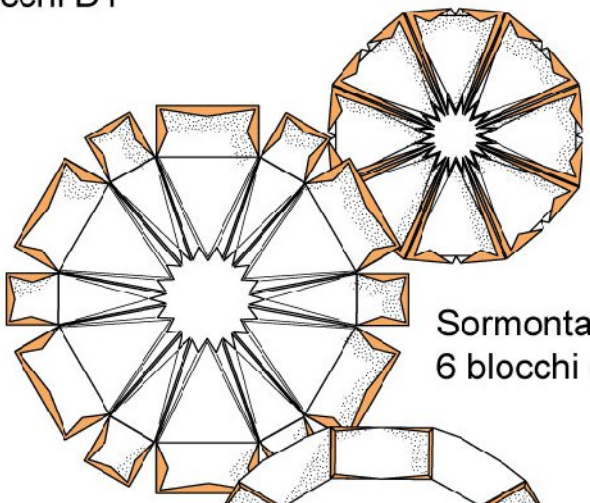
Sormontate 8 elementi di copertura



Pianta di torre esadecagonale ultimata

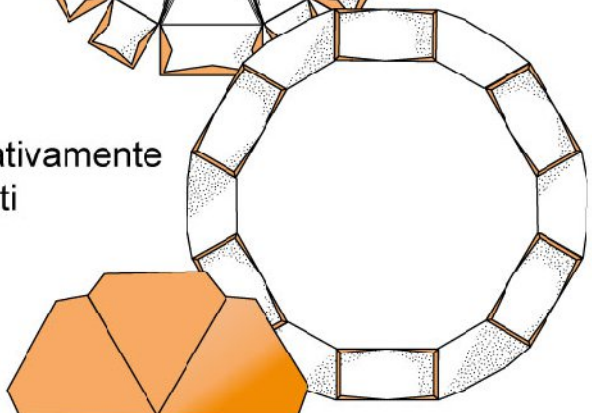
COSTRUZIONE DI UNA TORRE DODECAGONALE

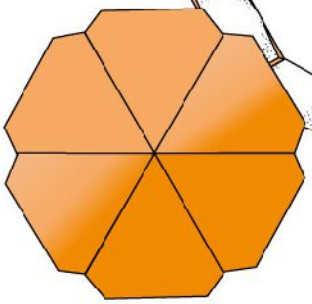
Partite unendo 8 blocchi D1



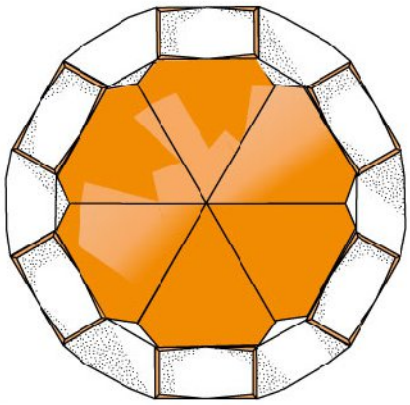
Sormontate alternativamente
6 blocchi e 6 semiblocchi base

Sormontate alternativamente
6 merli e 6 parapetti





Sormontate 6 elementi di copertura



Pianta di torre dodecagonale ultimata

FASI DI COSTRUZIONE DI UNA TORRE TONDA



1



2



3

ARCHITETTURA CONTEMPORANEA

L'architettura contemporanea è strutturalmente sostanzialmente differente da quella classica e da quella gotica, basate sull'uso degli archi e delle volte poggianti su spesse pareti in laterizio od in pietra..

L'architettura moderna normalmente è basata sull'uso di calcestruzzo armato ed acciaio in leggere strutture architravate, dove le pareti hanno perso l'originaria funzione portante e possono essere addirittura realizzate in cristallo.

Il calcestruzzo è un conglomerato formato da due componenti: legante e inerti.

Il legante è una polvere che con l'aggiunta di acqua diventa una specie di colla.

I romani adoperavano come legante polvere di roccia pozzolanica.

Ora si adopera cemento, che si ottiene da una miscela di calcare ed argilla, cotti in forni ad alta temperatura e macinati finemente.

Gli inerti, ghiaia o pietrisco e sabbia di fiume, sono materiali che servono per limitare il restringimento della struttura durante l'essiccazione.

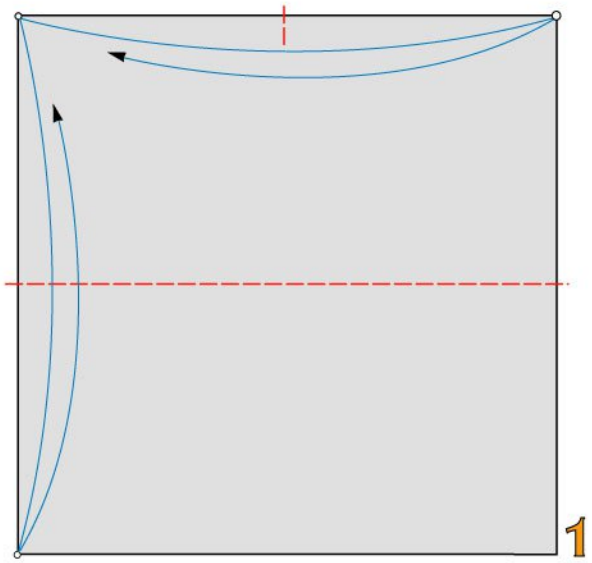
L'acciaio, modellato in gabbie si posiziona prima del versamento del calcestruzzo fuso nelle casseforme in corrispondenza delle zone tese, consentendo così la realizzazione di robuste travi e pilastri, tutti legati in una medesima struttura, chiamata "telaio in c.a."

Con l'acciaio si costruiscono strutture reticolari piane o spaziali, come i tralicci ed i ponti.

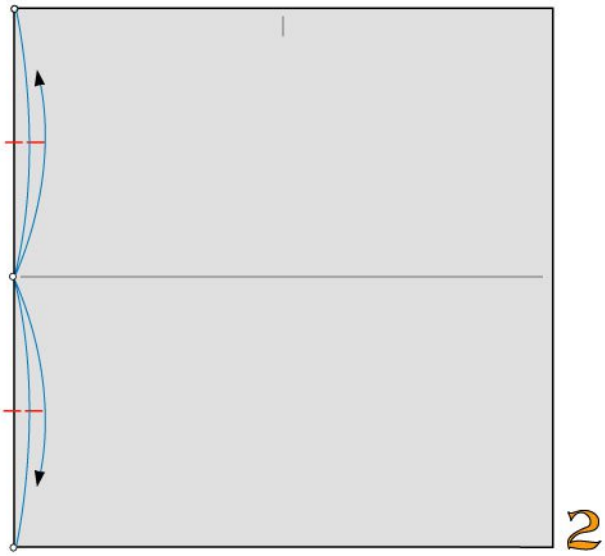
Noi qui realizzeremo edifici origami proprio con la stessa tecnica dei progettisti odierni, quindi non useremo i blocchi per costruire le pareti ma costruiremo dei telai di travi e pilastri in cui inserire pareti leggere con funzione unicamente di chiusura e ripartizione degli spazi.

PILASTRO a base rettangolare

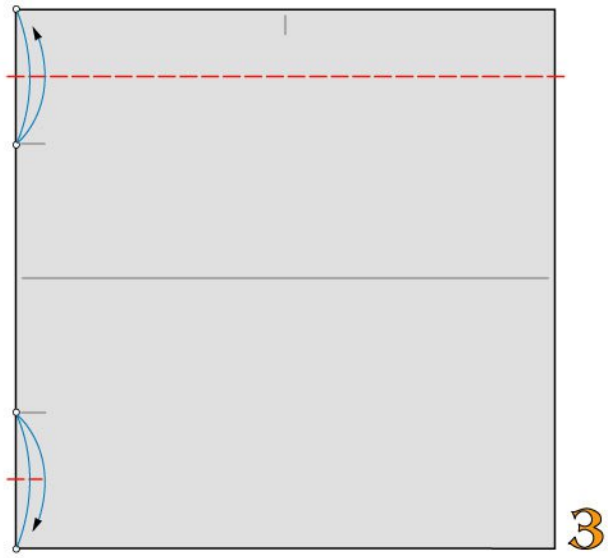
Per realizzare questo pilastro è necessario utilizzare carta pesante rousta o cartoncino leggero. Per la villa fotografata ho adoperato fogli di 8x8cm.



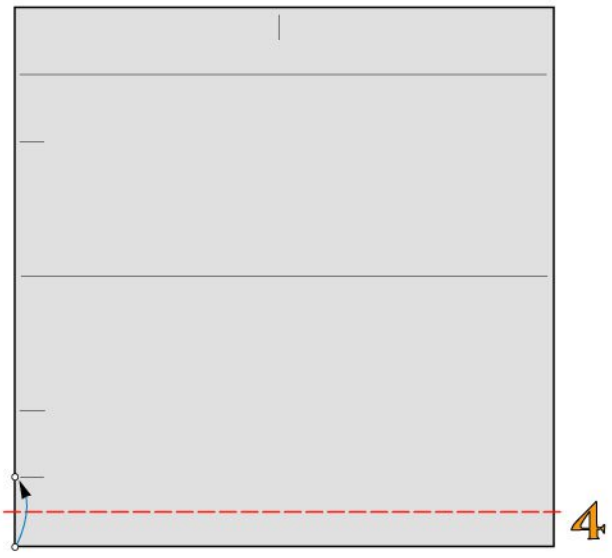
1 piega a valle orizzontale ed
1 piccola verticale



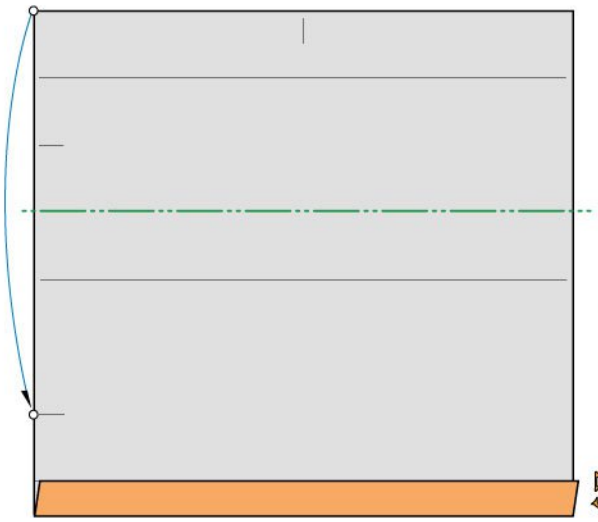
2 piccole pieghe a valle orizzontali



2 pieghe a valle orizzontali,
di cui 1 piccola

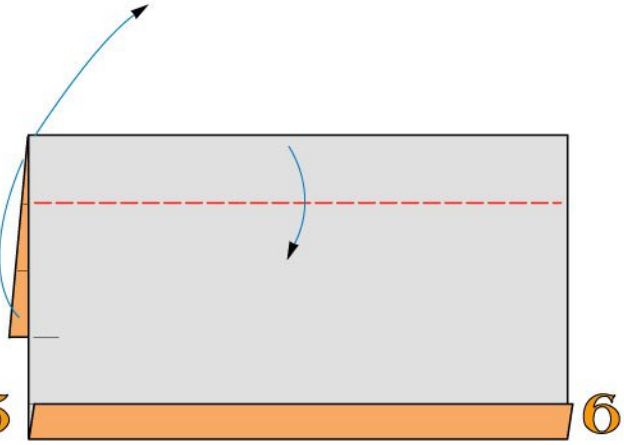


1 piega a valle orizzontale e ruotate



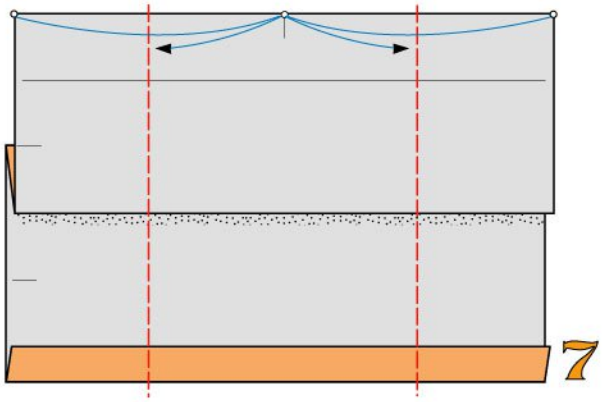
5

1 piega a monte orizzontale e ruotate



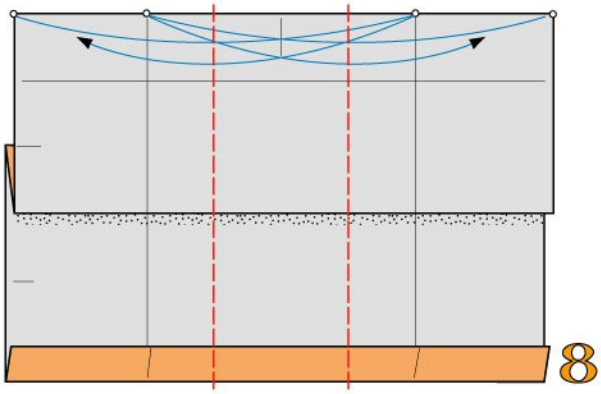
6

Ruotate ripiegando a valle



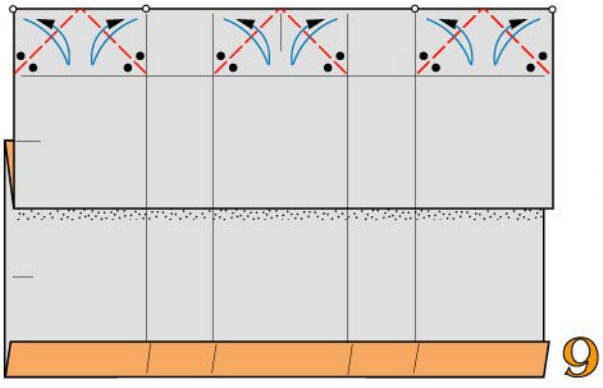
7

2 pieghe a valle



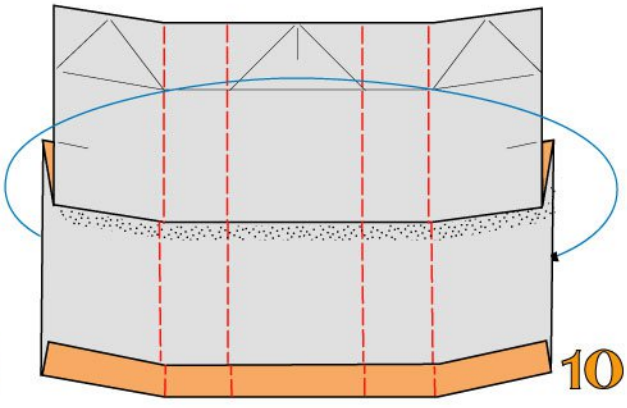
8

2 pieghe a valle



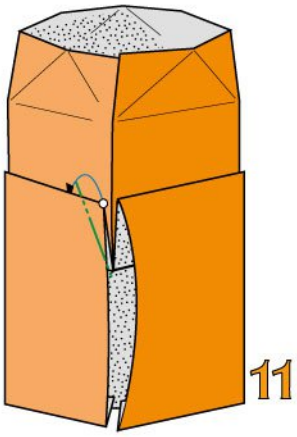
9

6 pieghe bisettrici a valle

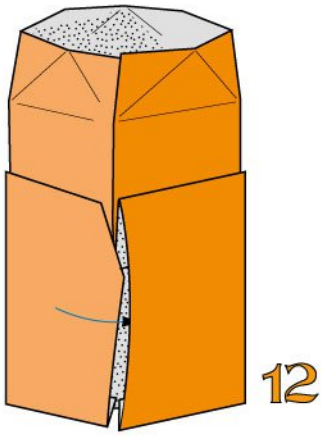


10

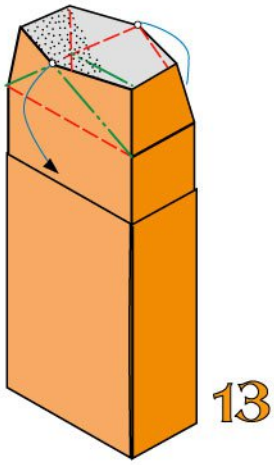
Chiudete 3D ripiegando a valle



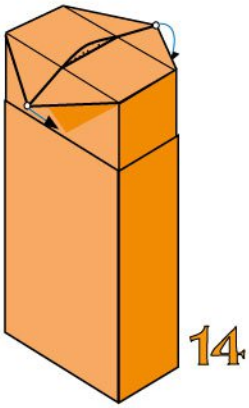
1 piega a monte
e ruotate

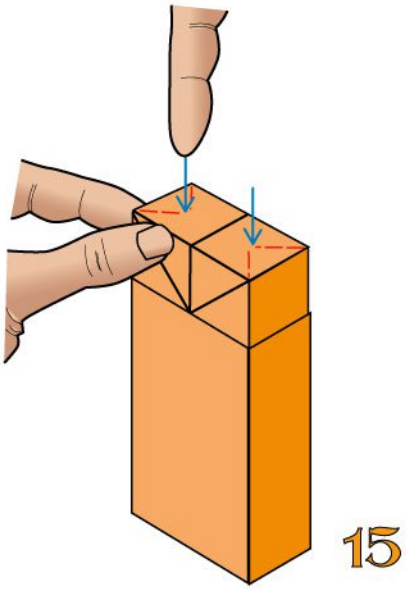


Intascate richiudendo
completamente fino
ad ottenere una
sezione rettangolare

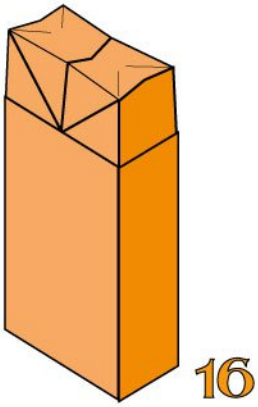


Ripiegando a valle ed
a monte abbassate 2
vertici

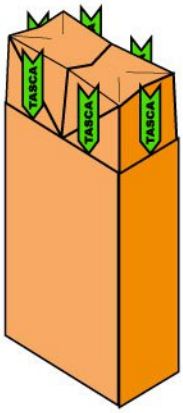




Comprimendo fate
rientrare leggermente
i quadrati superiori



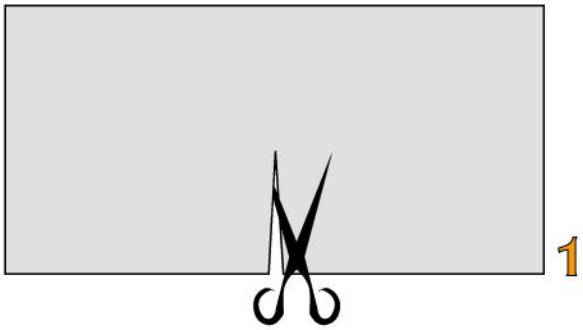
Pilastro rettangolare ultimato



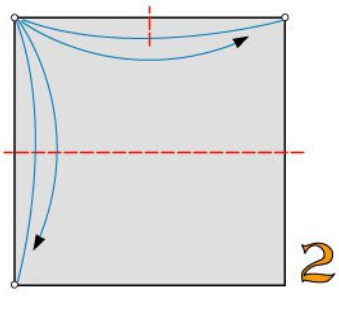
Sono utilizzabili 6 tasche
per inserire travi e pareti

CAPPUCCIO RETTANGOLARE

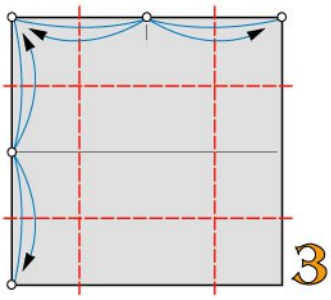
Elemento terminale del pilastro rettangolare.



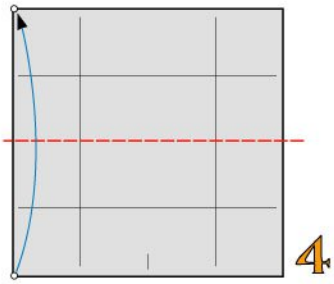
Piegate o dividete a metà un foglio rettangolare



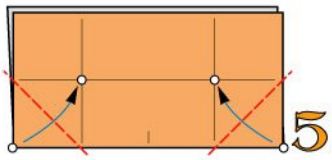
2 pieghe a valle



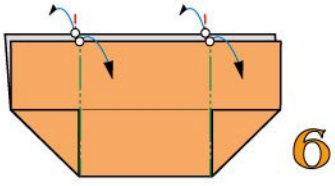
4 pieghe a valle



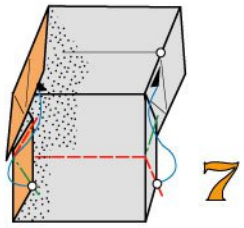
Ruotate ripiegando a valle



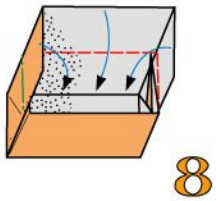
2 pieghe a valle e ruotate



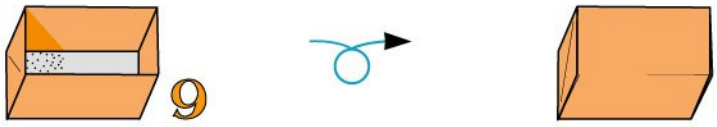
Ripiegando aprite 3D



2 pieghe a monte e richiudete 3D

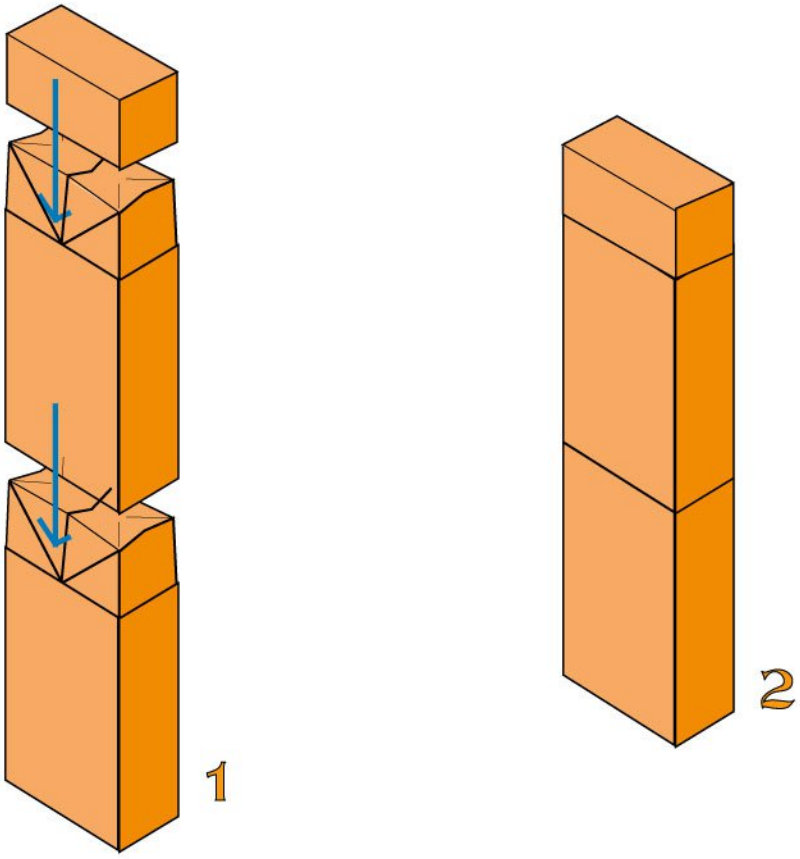


Rovesciate il bordo superiore



Cappuccio rettangolare ultimato

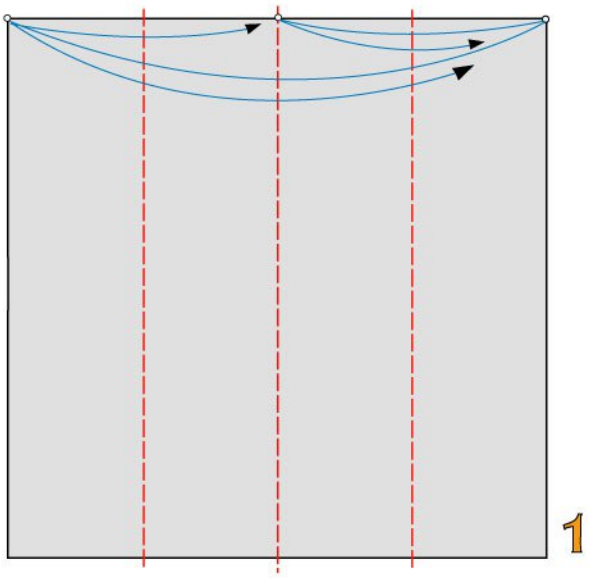
UNIONE DI 2 PILASTRI E CAPPUCCIO



2 pilastri si incastrano fra di loro dopo aver ancorato tutte le travi del piano

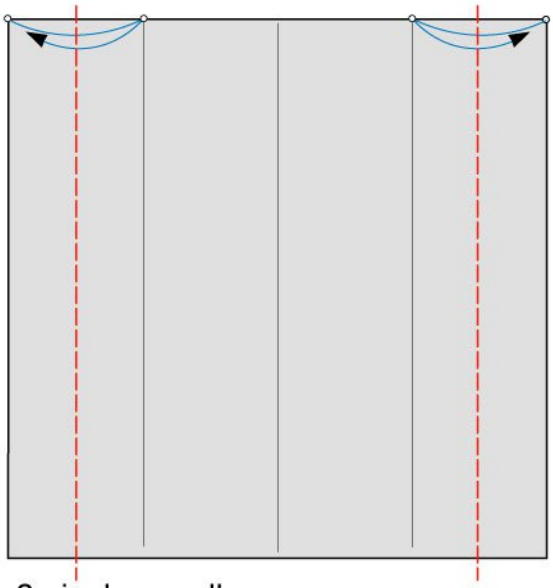
PILASTRO a base quadrata

Per realizzare questo pilastro è necessario utilizzare carta pesante rousta o cartoncino leggero.



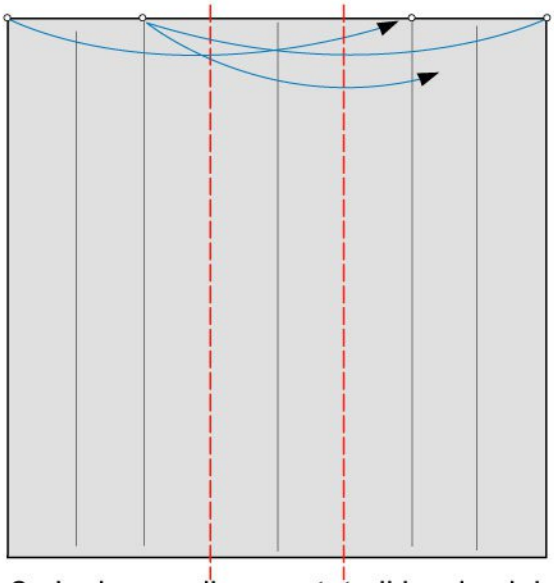
1

3 pieghe a valle



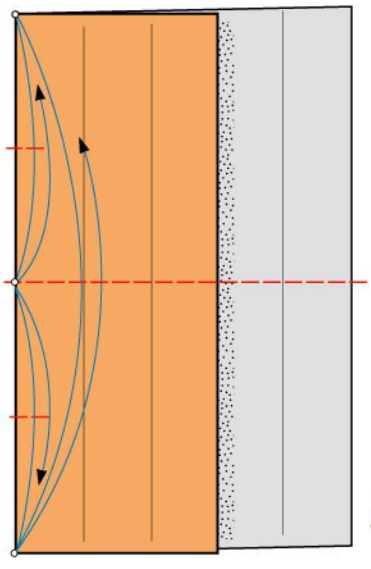
2

2 pieghe a valle



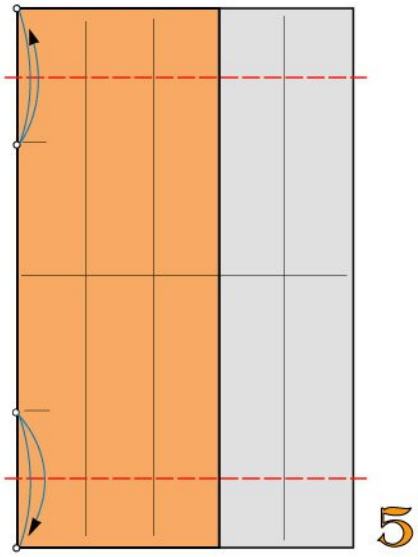
3

2 pieghe a valle e ruotate il bordo sinistro

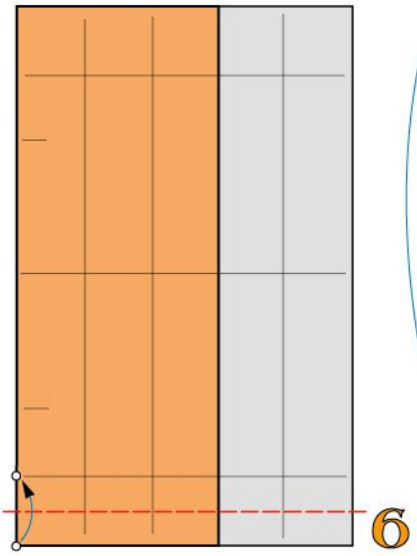


4

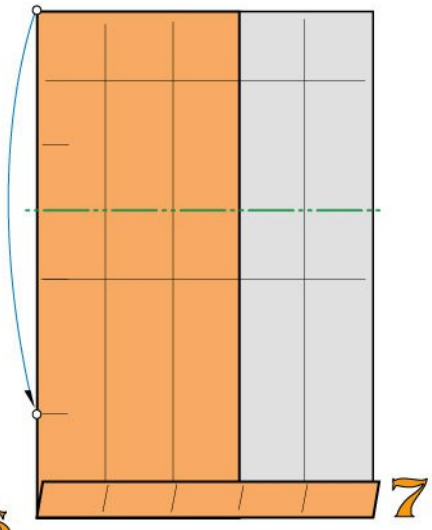
3 pieghe a valle



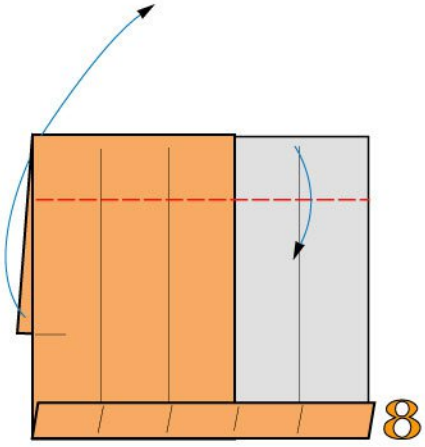
2 pieghe a valle



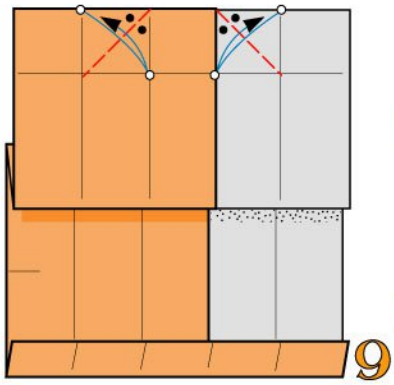
1 piega a valle e ruotate



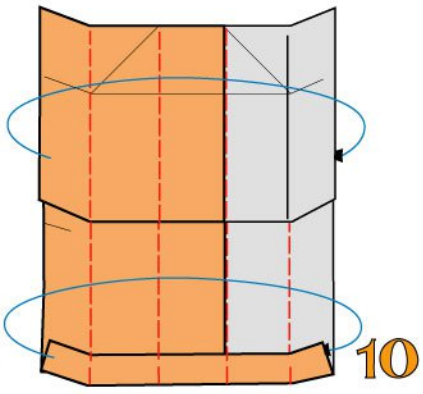
1 piega a monte e ruotate



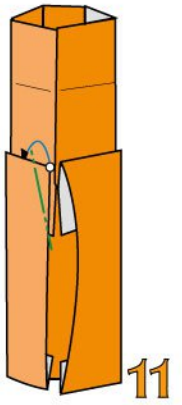
Ruotate ripiegando a valle



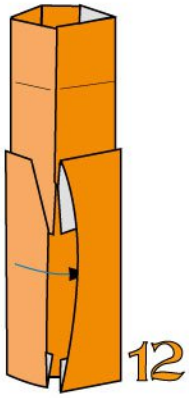
2 pieghe a valle



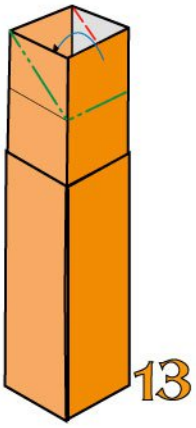
Chiudete 3D ripiegando a valle



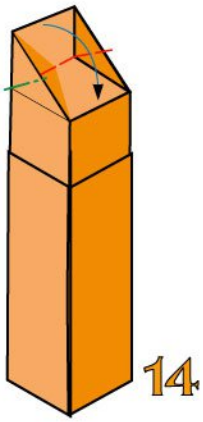
1 piega a monte e ruotate



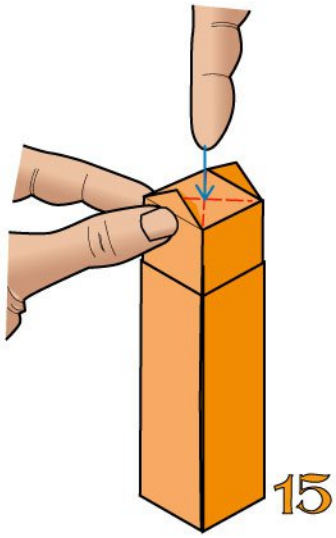
intascate



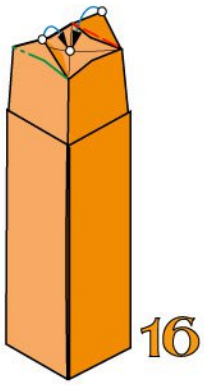
3 pieghe a monte e ruotate abbassando il bordo indicato



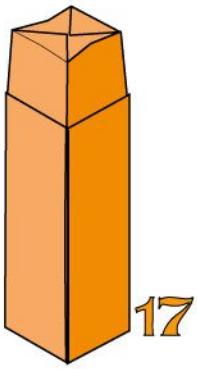
Abbassate anche il bordo opposto



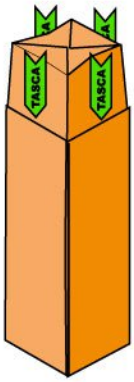
Comprimendo fate rientrare leggermente il centro



Abbassate i 2 vertici indicati



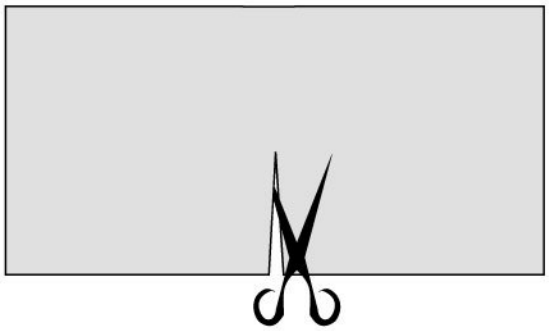
Pilastro quadrato ultimato



Sono utilizzabili 4 tasche

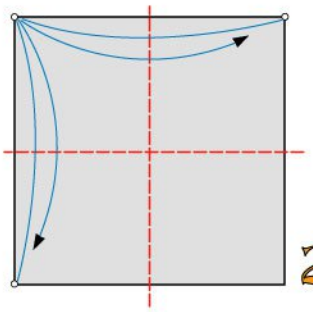
CAPPUCCIO QUADRATO

È l'elemento terminale del pilastro quadrato



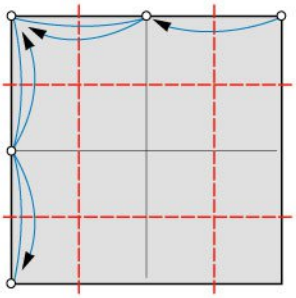
1

Piegate o dividete a metà un foglio rettangolare



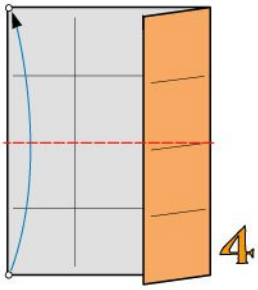
2

2 pieghe a valle



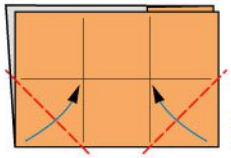
3

4 pieghe a valle



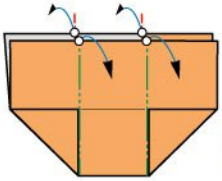
4

Ruotate ripiegando a valle



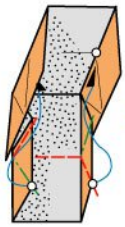
5

2 pieghe a valle e ruotate



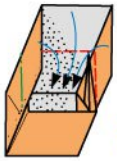
6

Ripiegando aprite 3D



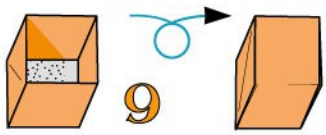
7

2 pieghe a monte e richiudete 3D



8

Rovesciate il bordo superiore

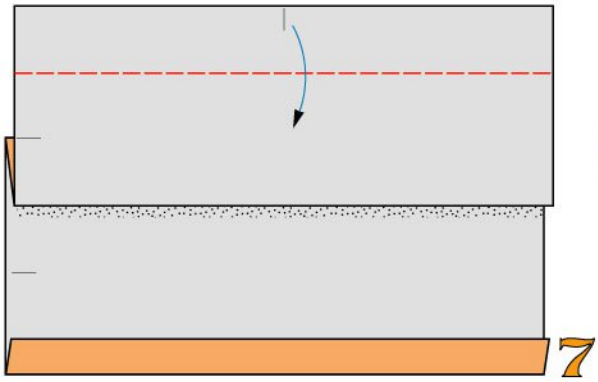


9

Cappuccio quadrato ultimato

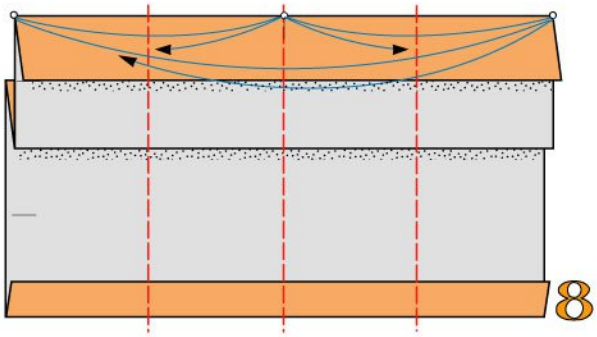
PILASTRO a base triangolare

Anche per realizzare questo pilastro è necessario utilizzare carta pesante robusta o cartoncino leggero.



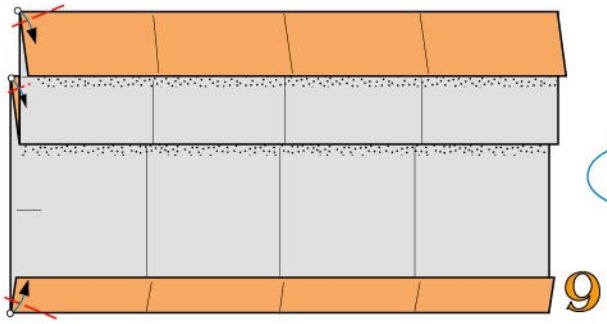
7

Partite dalla fig. n. 6 del pilastro rettangolare



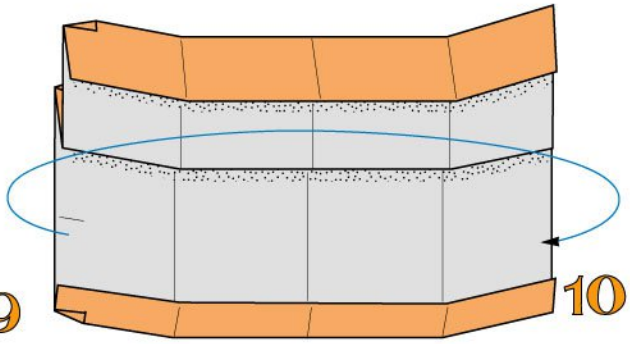
8

3 pieghe a valle



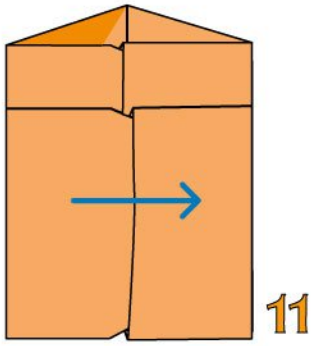
9

3 piccole pieghe a valle e ruotate



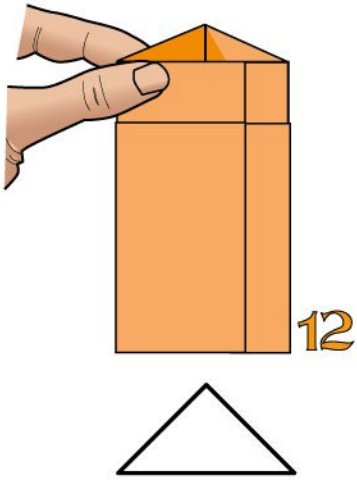
10

Chiudete 3D ripiegando a valle

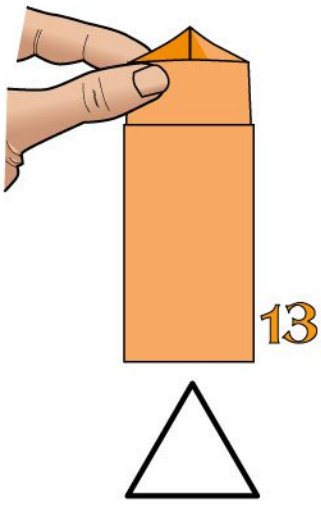


11

Intascate parzialmente
per ottenere un pilastro
a base triangolo isoscele



12

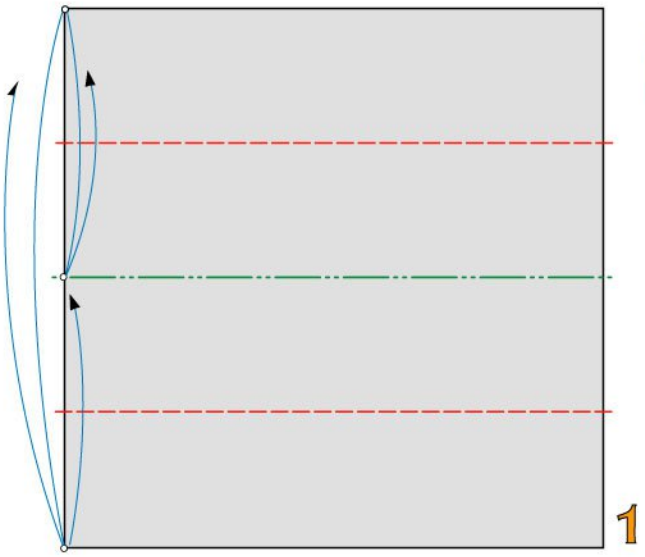


13

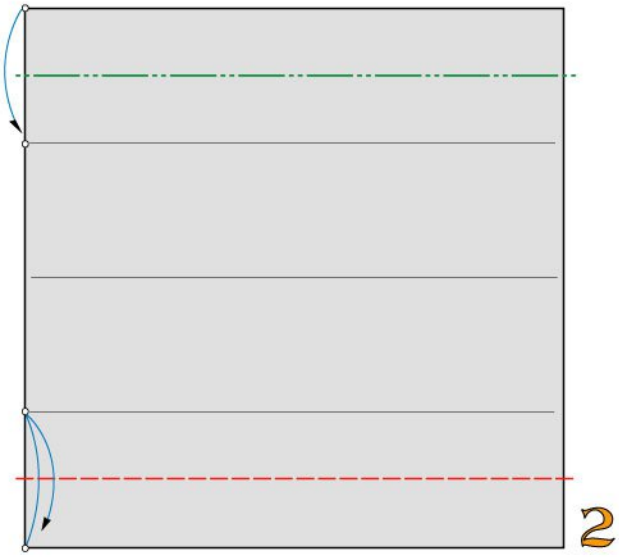
Intascate fino in fondo per ottenere
un pilastro a base triangolo equilatero

TRAVE stretta in legno o C.A.

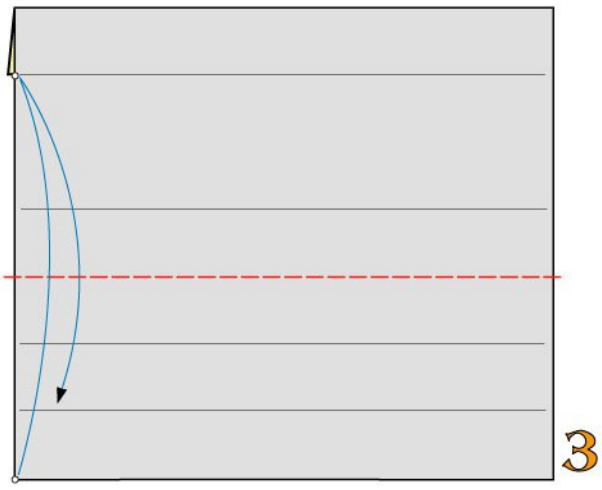
È l'elemento di collegamento strutturale dei pilastri, e per questo motivo la carta da utilizzare deve essere robusta



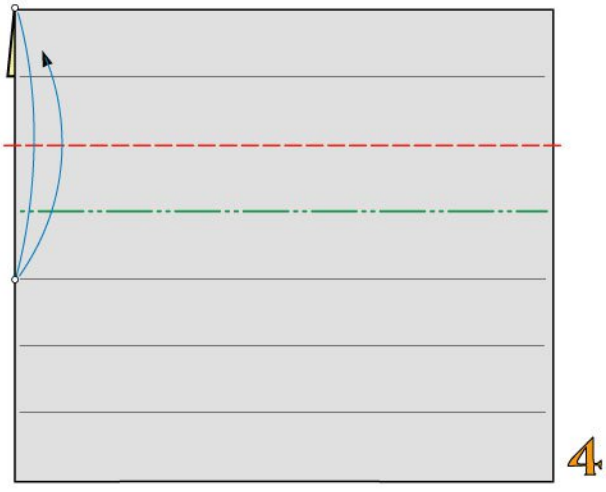
1 piega a monte centrale e 2 a valle



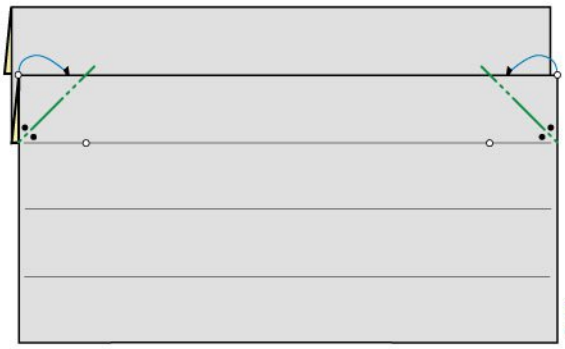
1 piega a valle e ruotate una piega a monte



1 piega a valle

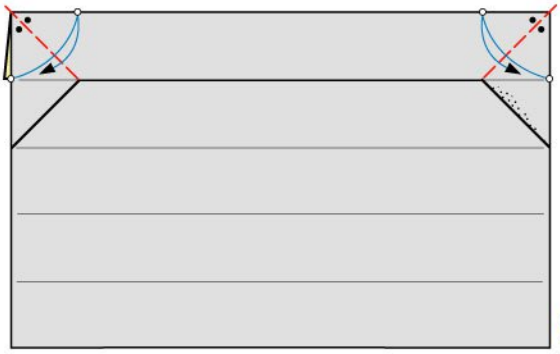


1 piega a valle e ruotate ripiegando a monte



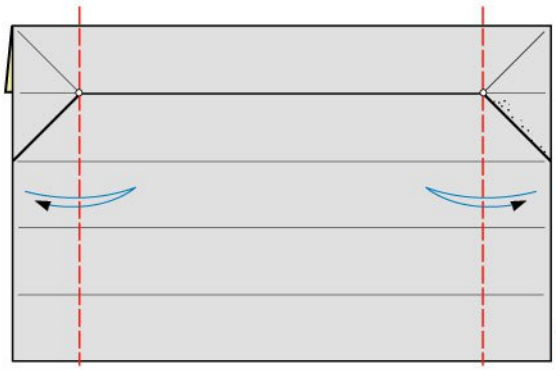
5

2 pieghe bisettrici a monte e ruotate



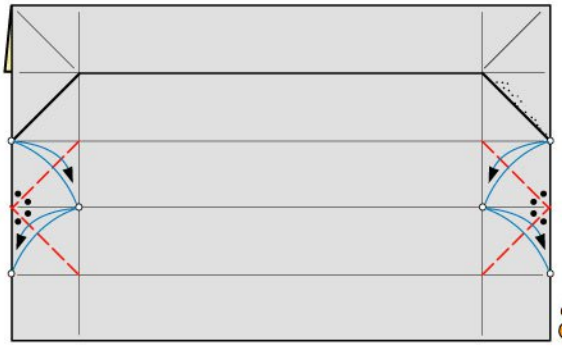
6

2 pieghe bisettrici a valle



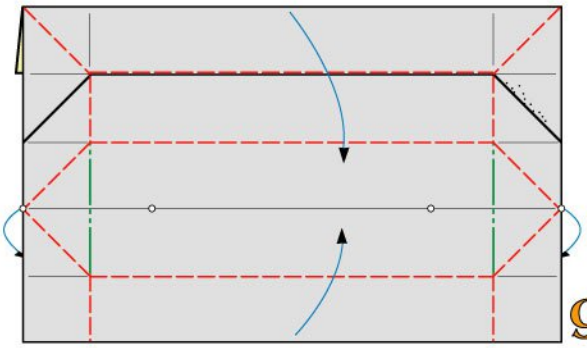
7

2 pieghe a valle

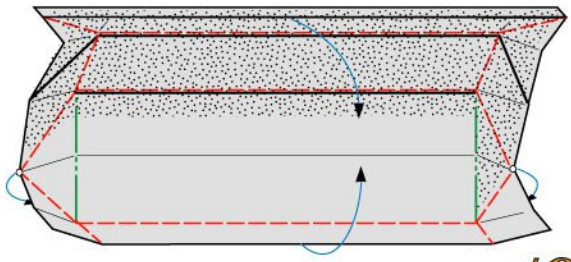


8

4 pieghe bisettrici a valle

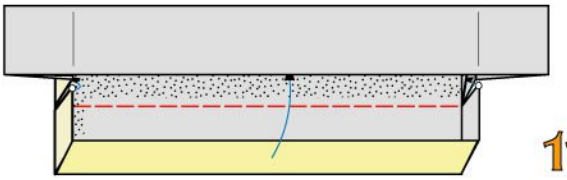


9



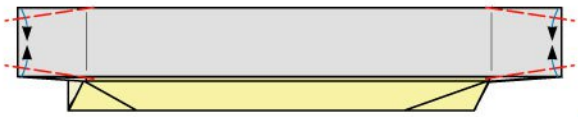
10

Ripiegando a valle ed a monte
modellate 3D



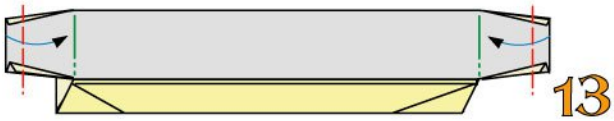
11

Ripiegando a valle ed a monte
richiudete



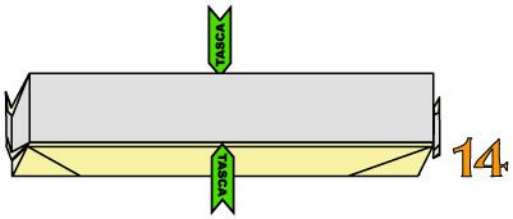
12

4 pieghe bisettrici a valle e ruotate



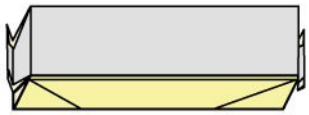
13

2 pieghe a valle e ruotate ripiegando a monte



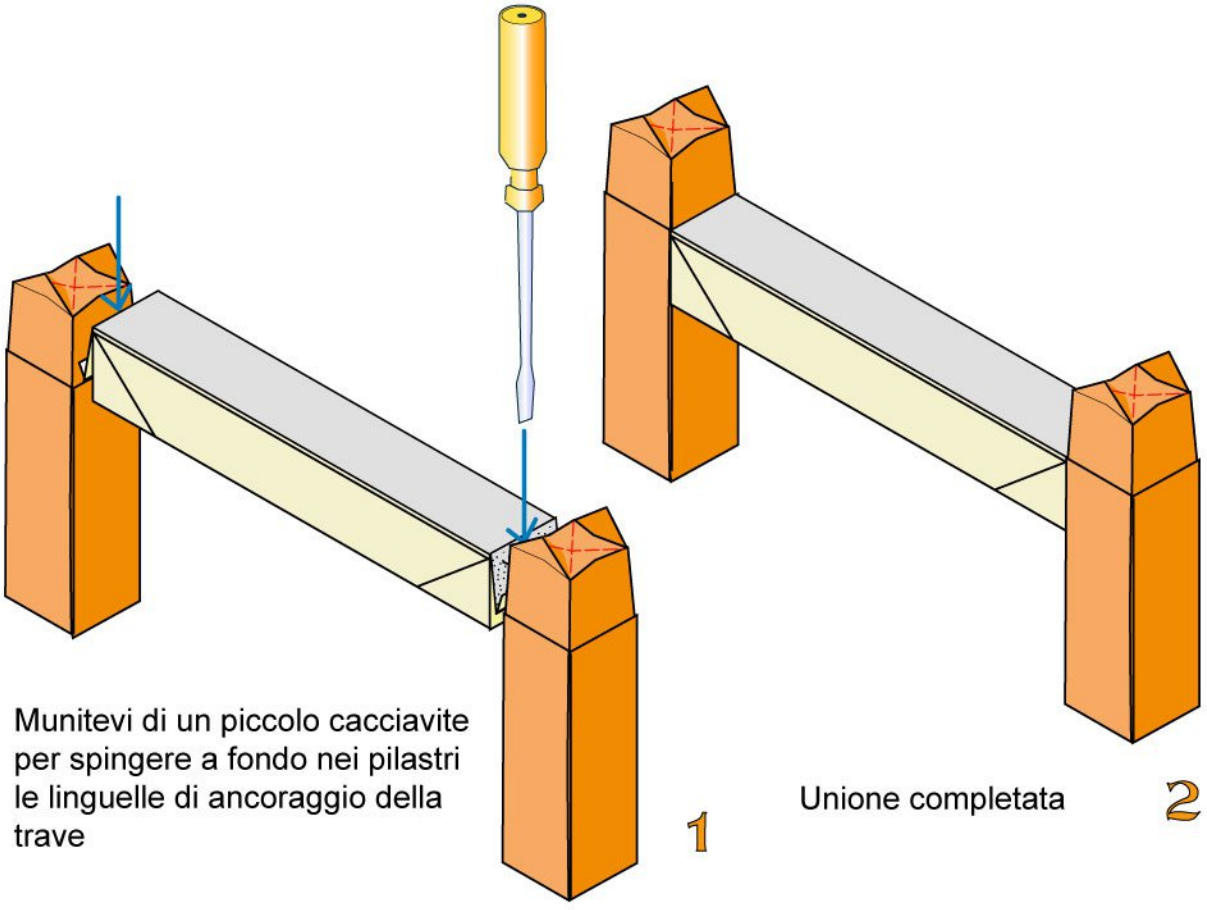
14

Nella trave sono presenti 2 tasche per l'inserimento di solai e pareti



Può essere utile la realizzazione di travi di lunghezza ridotta

MONTAGGIO DI UNA TRAVE SU 2 PILASTRI A SEZIONE QUADRATA



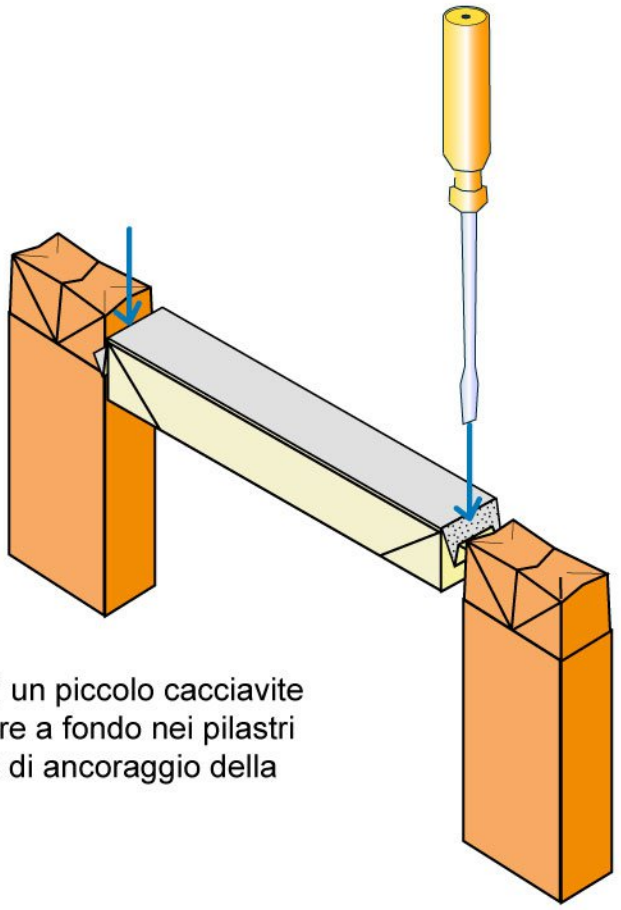
Munitevi di un piccolo cacciavite per spingere a fondo nei pilastri le linguelle di ancoraggio della trave

1

Unione completata

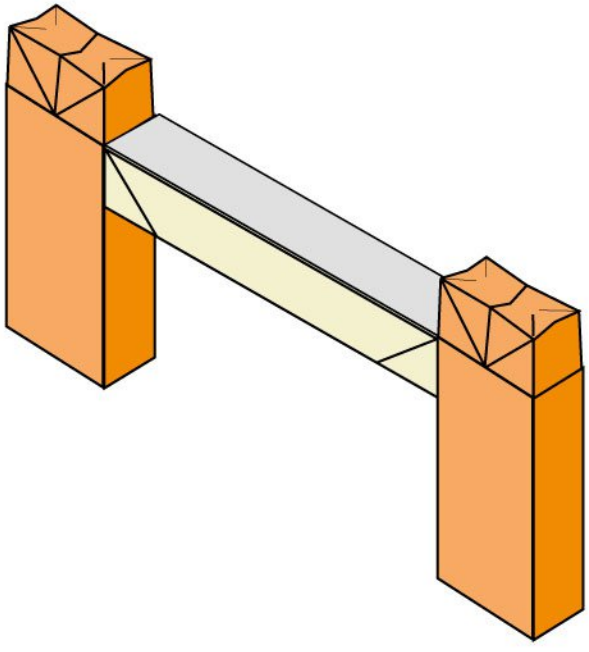
2

MONTAGGIO DI UNA TRAVE SU 2 PILASTRI A SEZIONE RETTANGOLARE



Munitevi di un piccolo cacciavite per spingere a fondo nei pilastri le linguelle di ancoraggio della trave

1

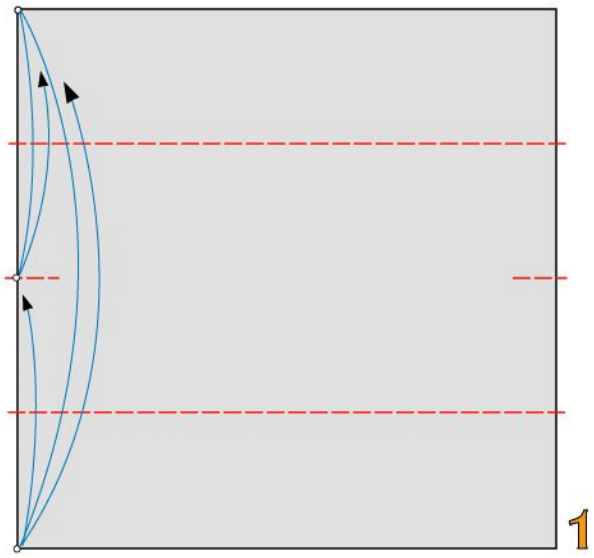


2

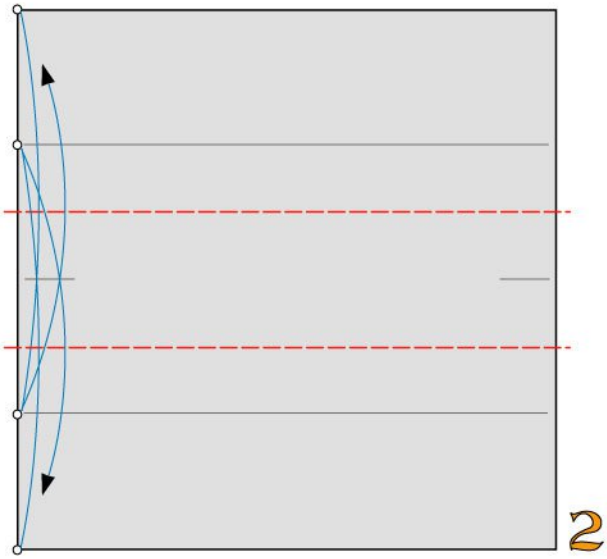
Unione completata

TRAVE larga in legno o C.A.

Adoperate carta robusta o cartoncino leggero



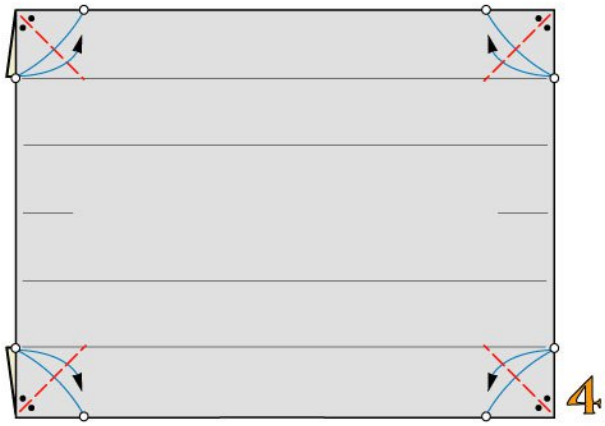
3 pieghe a valle



2 pieghe a valle



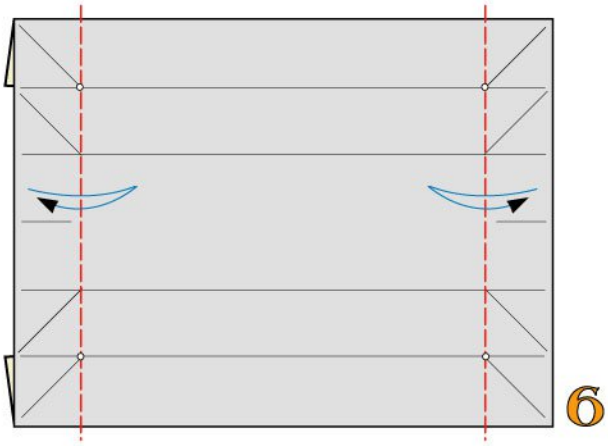
2 pieghe a monte e ruotate



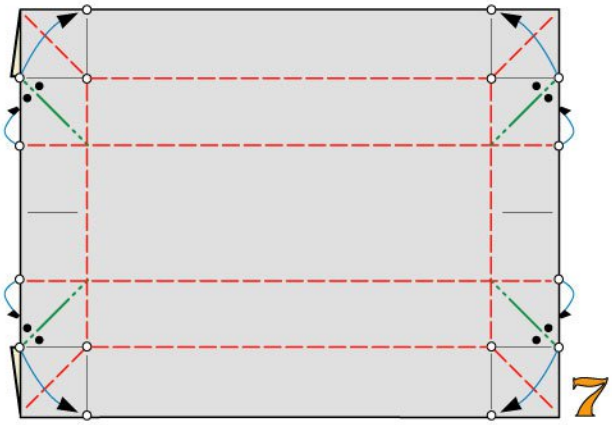
4 pieghe bisettrici a valle

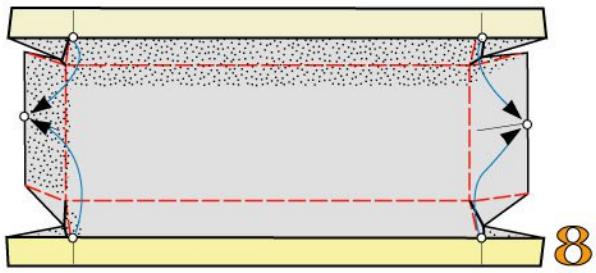


4 pieghe bisettrici a monte

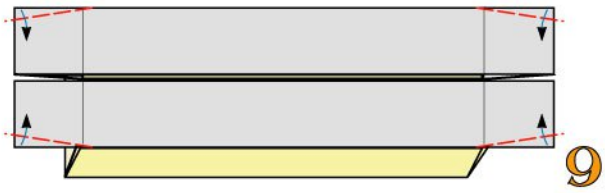


2 pieghe a valle

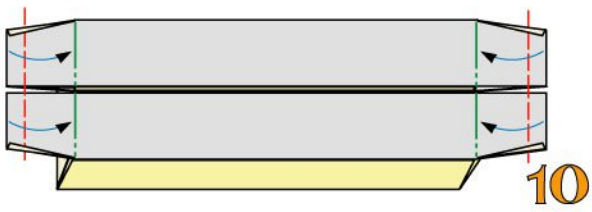




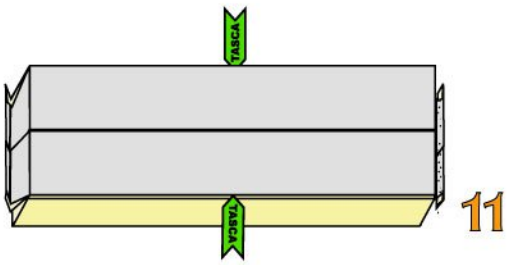
Chiudete 3D ripiegando
a valle ed a monte



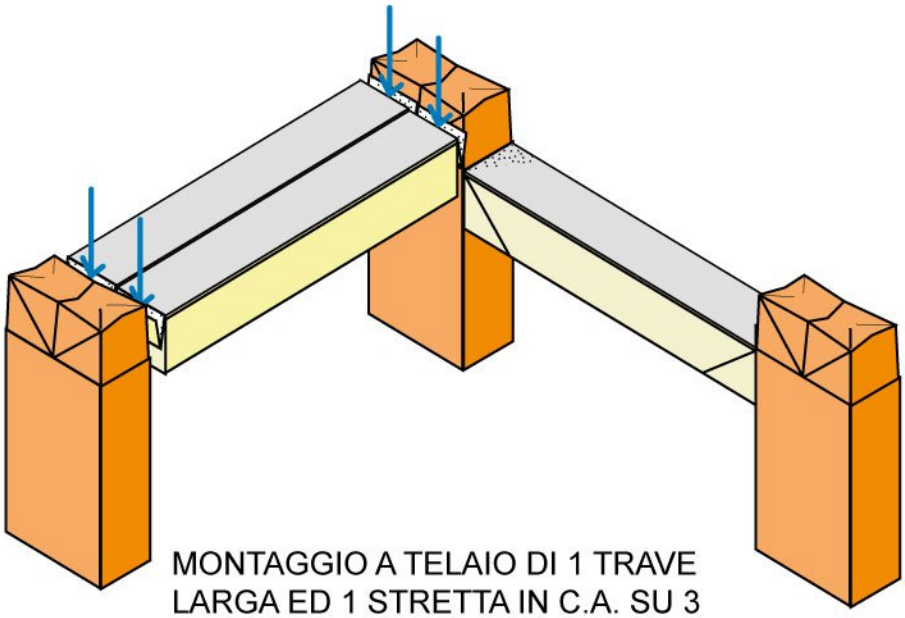
4 pieghe a valle e ruotate



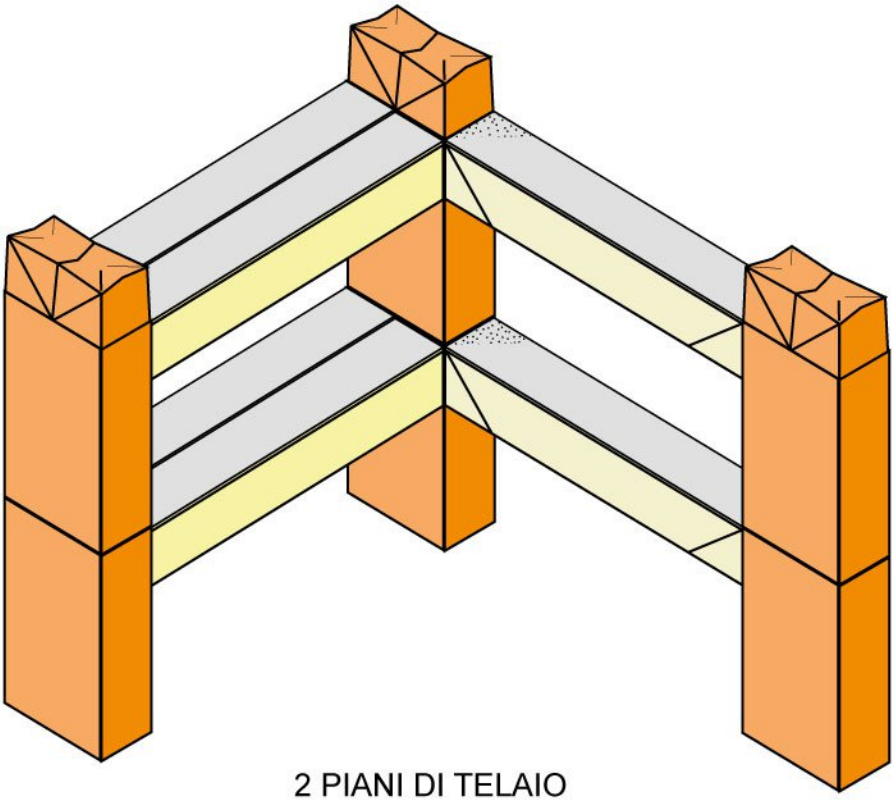
4 pieghe a valle e ripiegate a monte



Trave larga in legno o c.a. ultimata



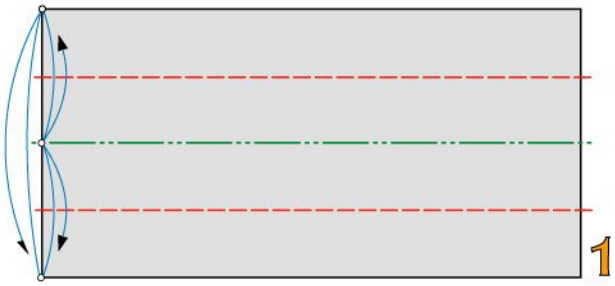
MONTAGGIO A TELAIO DI 1 TRAVE LARGA ED 1 STRETTA IN C.A. SU 3 PILASTRI RETTANGOLARI



2 PIANI DI TELAIO

2_2-TRAVE stretta in acciaio

Elemento di collegamento strutturale dei pilastri, con sezione ad “L”.
Adoperate carta robusta



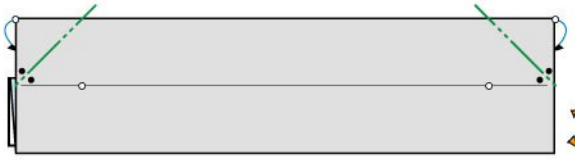
1

1 piega a monte e 2 a valle



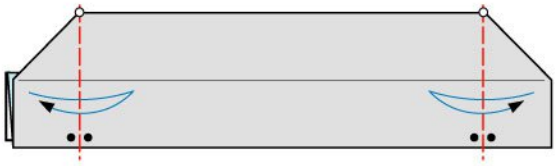
2

Ripiegando, ruotate



3

2 pieghe a monte e ruotate



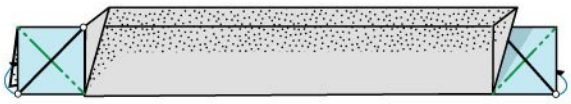
4

2 pieghe bisettrici a valle



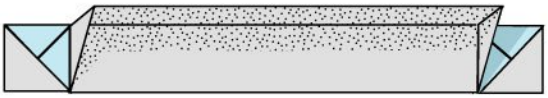
5

2 pieghe bisettrici a valle e, ripiegando, ruotate 3D



6

2 pieghe bisettrici a monte e ruotate all’interno



7

ribaltate



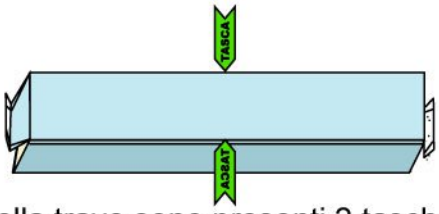
8

4 pieghe a valle e ruotate



9

2 pieghe a valle e ruotate ripiegando a monte

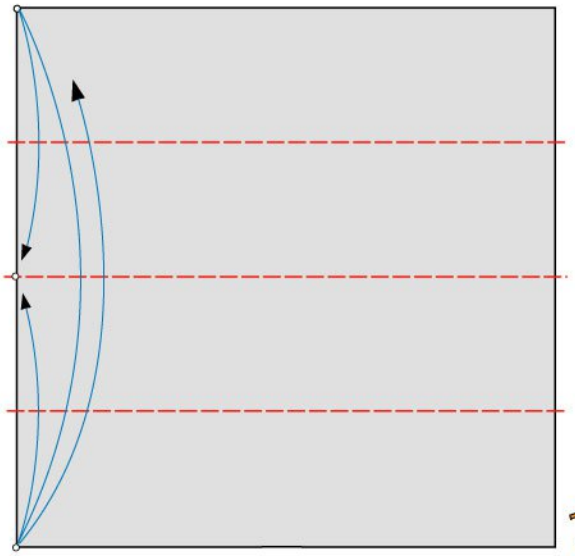


10

Nella trave sono presenti 2 tasche per l’inserimento di solai e pareti

2_3-TRAVE larga in acciaio

Elemento di collegamento strutturale dei pilastri, con sezione a “T”.
Adoperate carta robusta



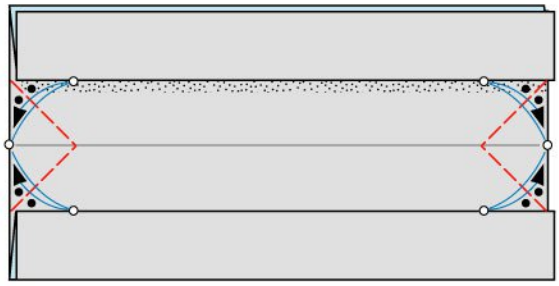
1

3 pieghe a valle



2

2 pieghe a valle e ruotate



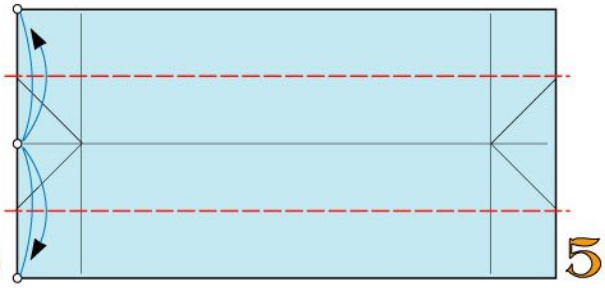
3

4 pieghe bisettrici a valle



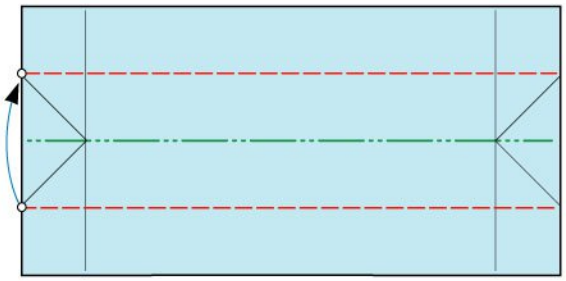
4

2 pieghe bisettrici a valle e ribaltate



5

2 pieghe a valle



6

Ripiegando ruotate 3D



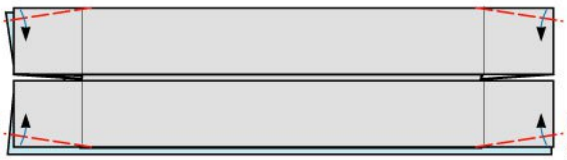
4 pieghe a valle e, ripiegando a monte,ruotate 3D

7



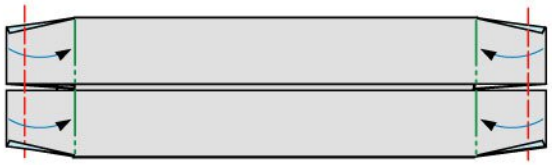
8

Ribaltate



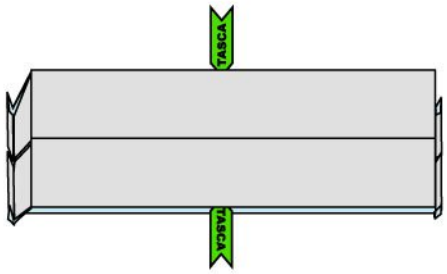
9

4 pieghe a valle e ruotate



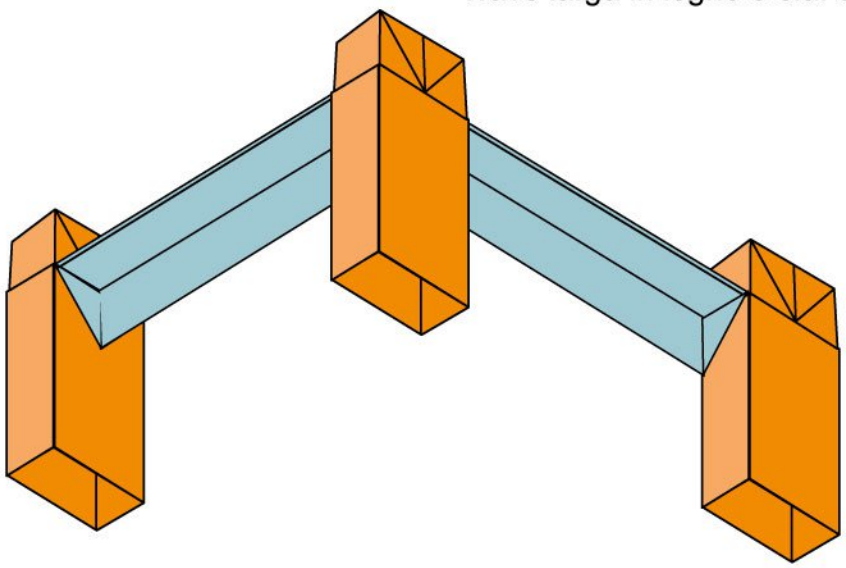
10

4 pieghe a valle e ruotate ripiegando a monte



11

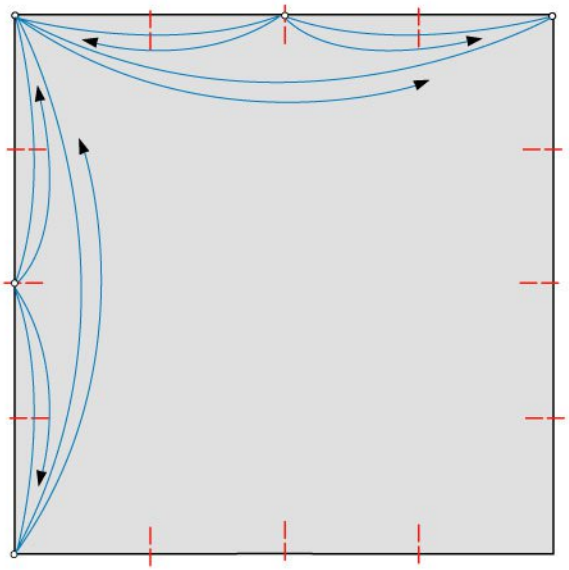
Trave larga in legno o c.a. ultimata



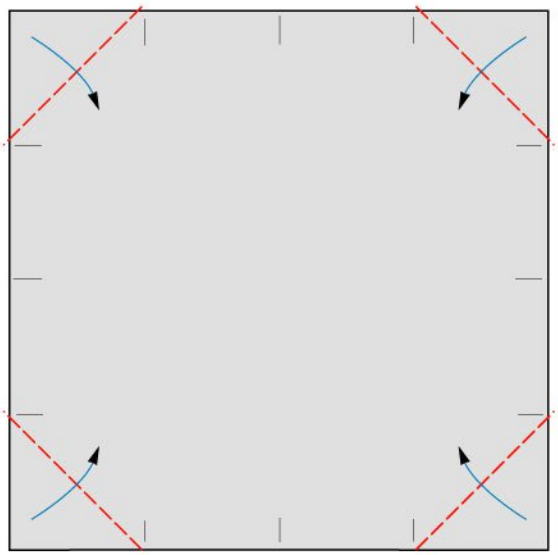
UNIONE DI 3 PILASTRI RETTANGOLARI CON UNA TRAVE LARGA ED UNA STRETTA IN ACCIAIO

SOLAIO

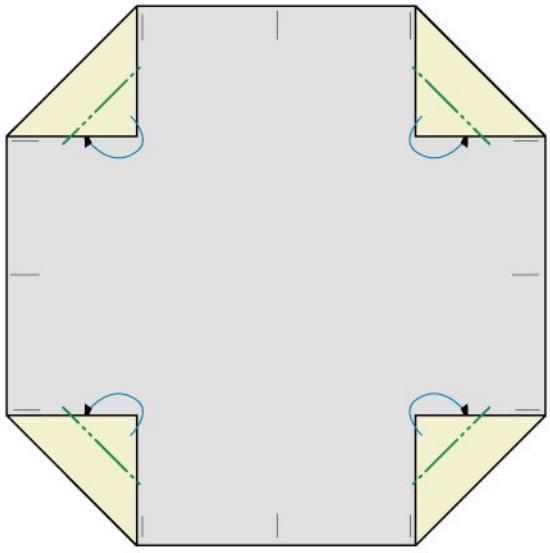
Semplicissima piastra che si incastra nelle tasche delle travi



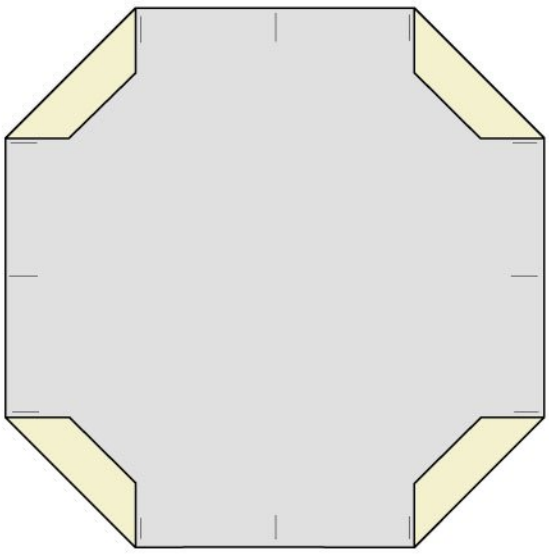
Dividete i lati in quarti



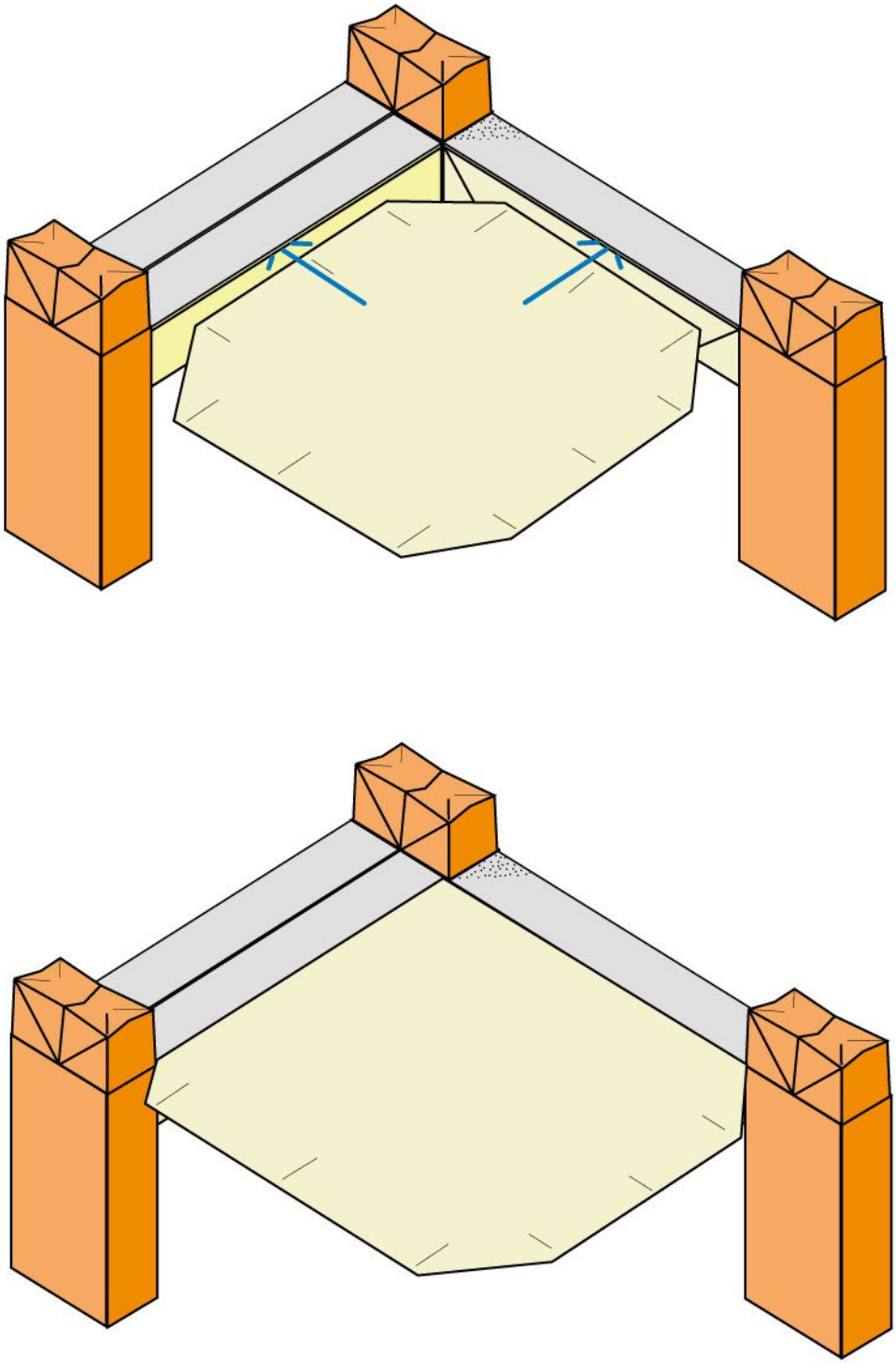
4 pieghe a valle e ruotate



4 pieghe a monte e ruotate



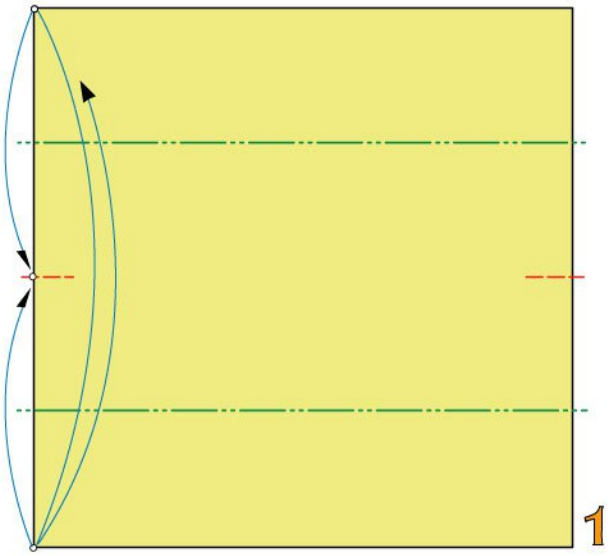
Piastra solaio ultimata



MONTAGGIO DI UN SOLAIO NELLE TRAVI

POGGIOLO

Importante elemento architettonico inventato dai romani nelle insulae, che erano gli antenati dei nostri condomini.
Nell'edilizia moderna le dimensioni possono essere importanti; il parapetto può essere costruito con diversi materiali, nel nostro caso è pieno in laterizio o c.a.



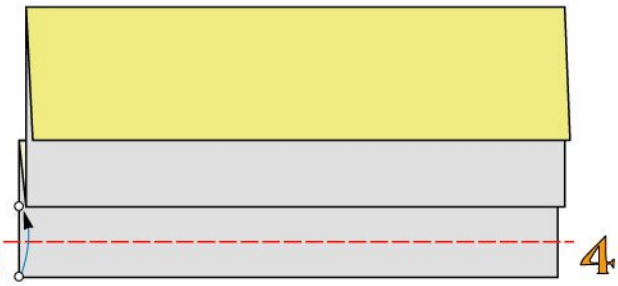
2 pieghe a valle, 2 a monte e ruotate



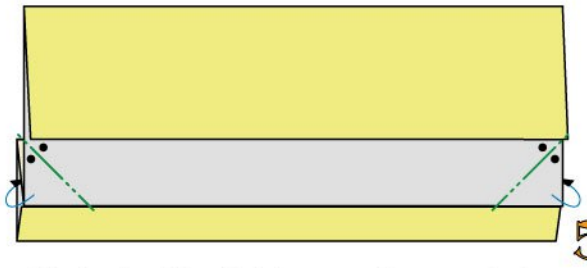
1 piega a valle solo sulla sup. in vista e ruotate



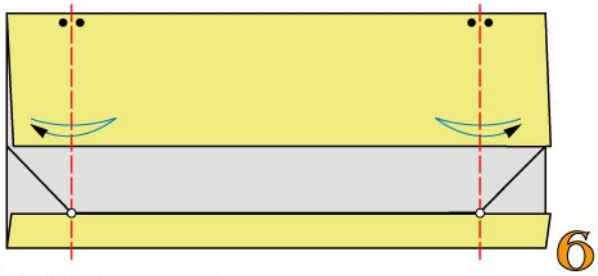
Ribaltate



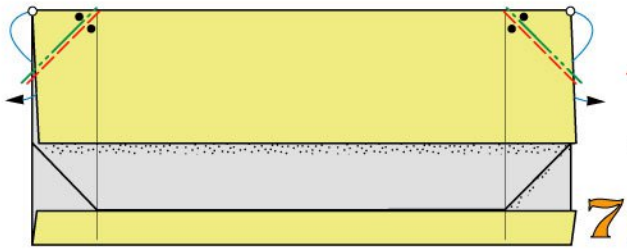
Una piega a valle e ruotate



2 pieghe bisettrici a monte e ruotate

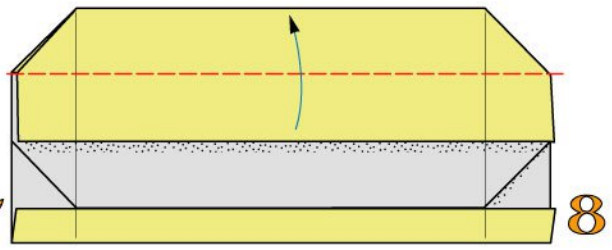


2 pieghe a valle



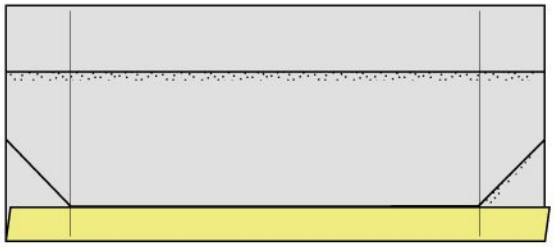
7

2 pieghe rovesce interne



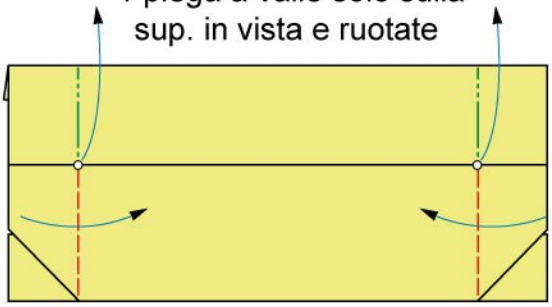
8

1 piega a valle solo sulla sup. in vista e ruotate



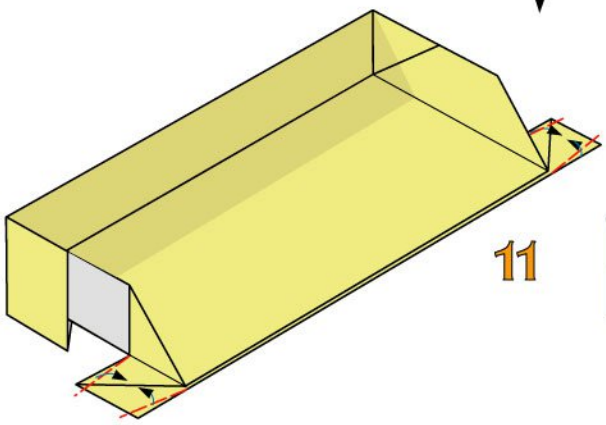
9

Ribaltate



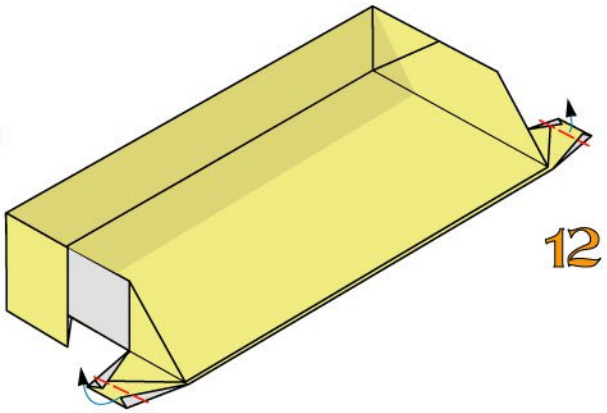
10

Ripiegando aprite 3D



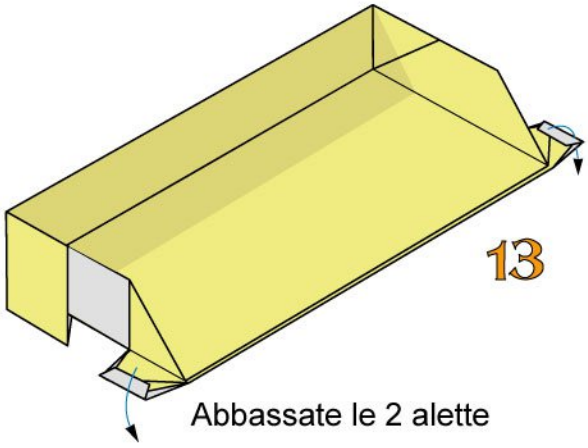
11

4 pieghe a valle e ruotate



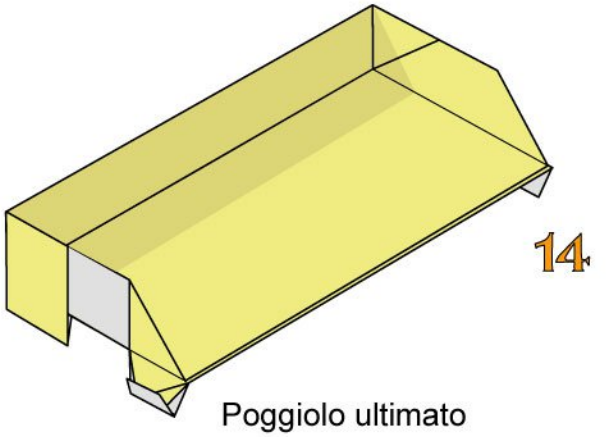
12

2 pieghe a valle e ruotate



13

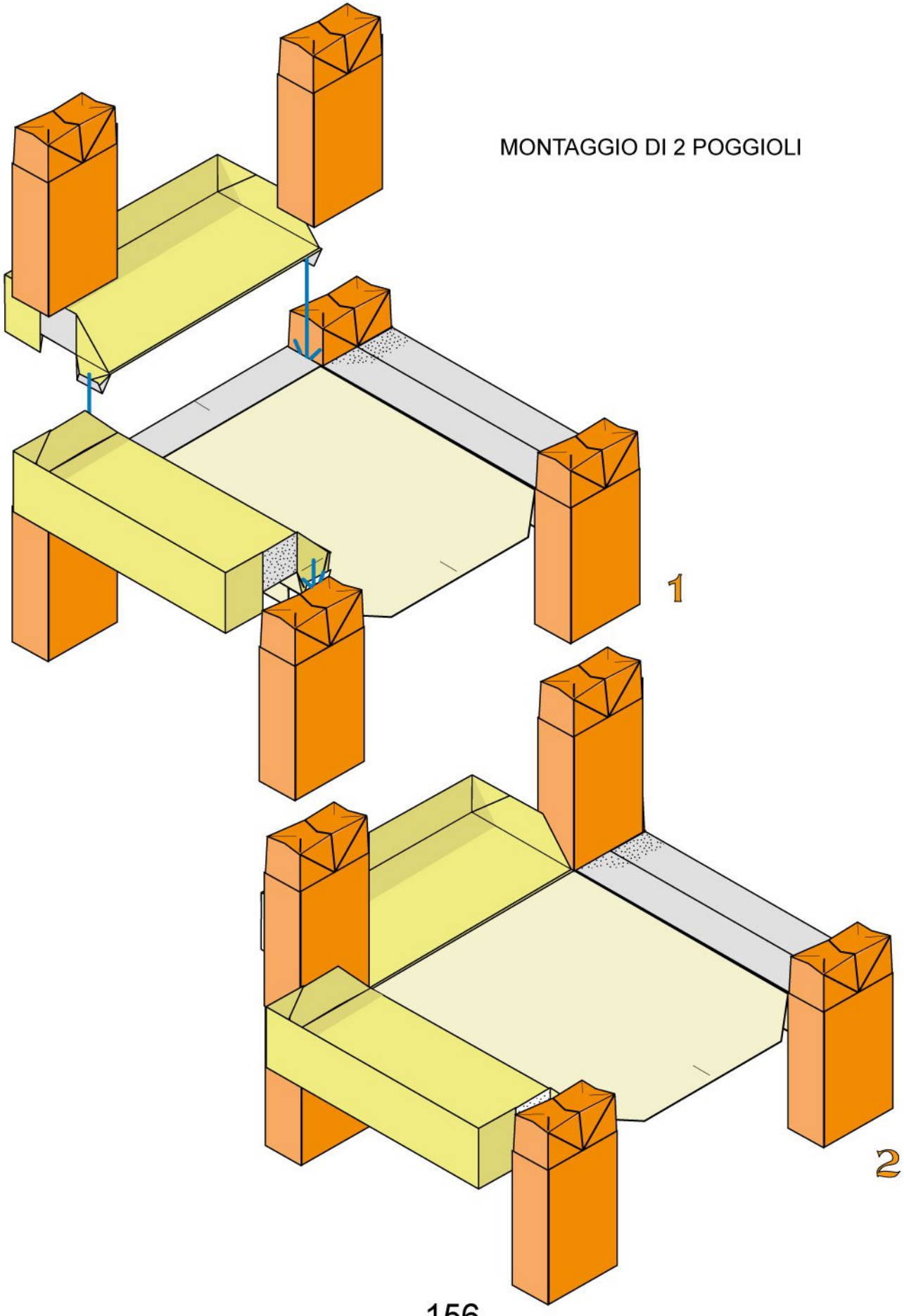
Abbassate le 2 alette



14

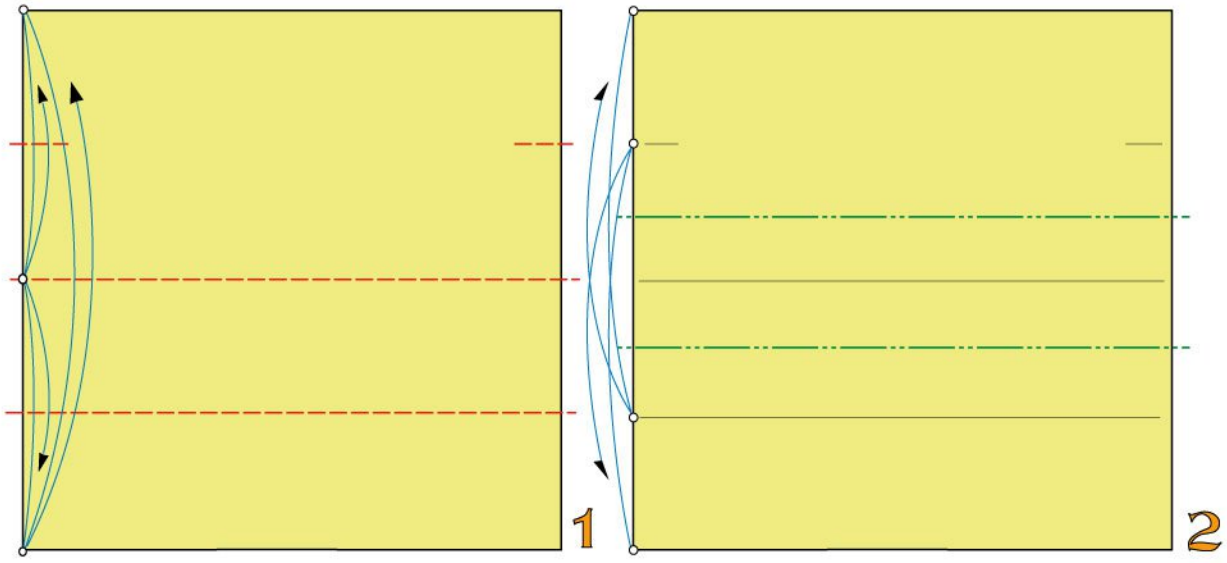
Poggiolo ultimato

MONTAGGIO DI 2 POGGIOLI



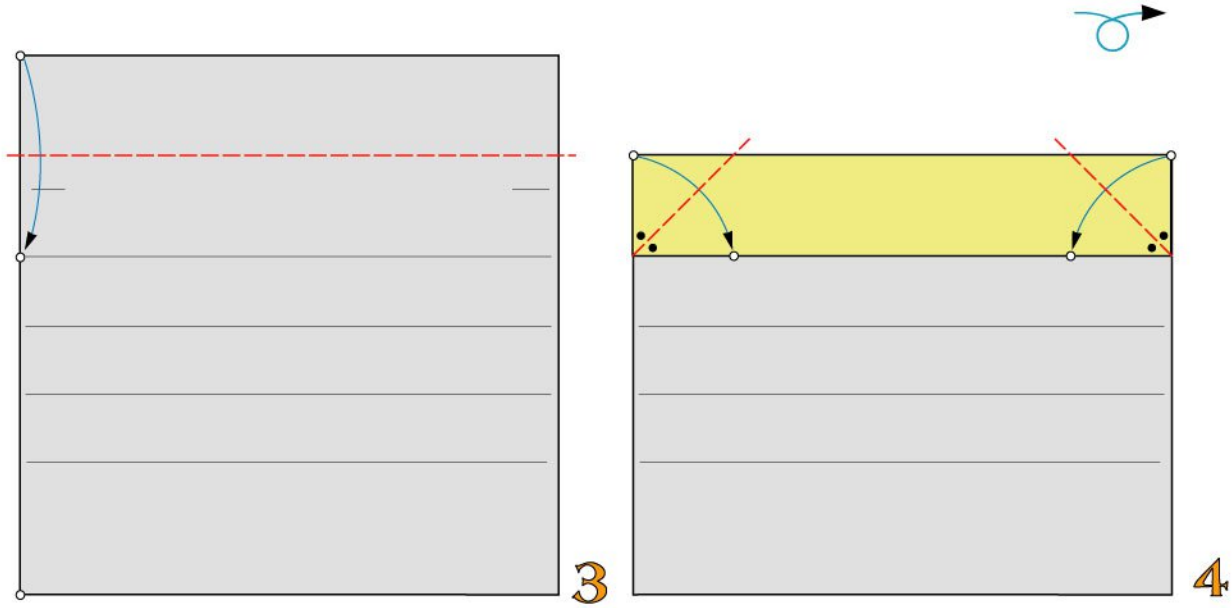
PARAPETTO

Costruzione di un poggiolo a sporgenza =0, cioè costruito a filo della trave.
Si può montare singolarmente o superiormente ad una trave.



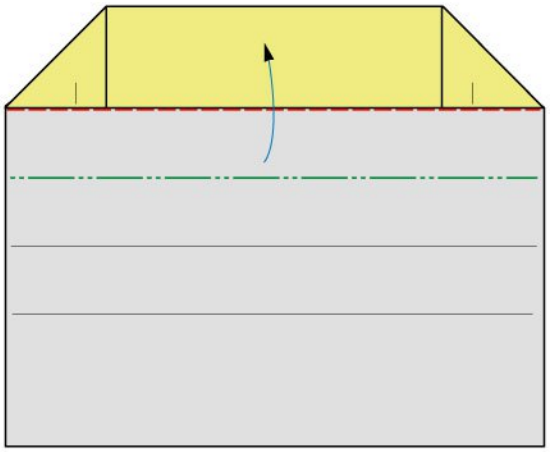
4 pieghe a valle

2 pieghe a monte e ribaltate



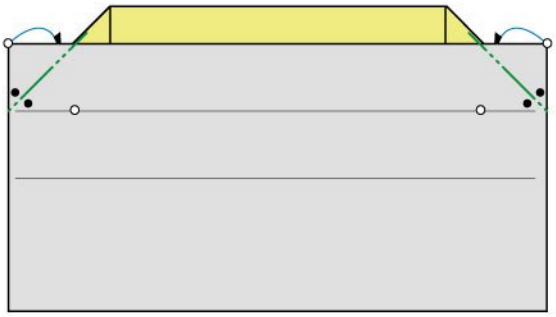
1 piega a valle e ruotate

2 pieghe bisettrici a valle e ruotate



5

Ruotate ripiegando a valle ed a monte



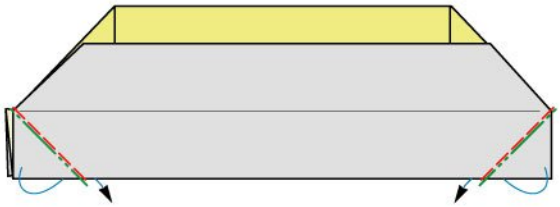
6

2 pieghe bisettrici a monte e ruotate



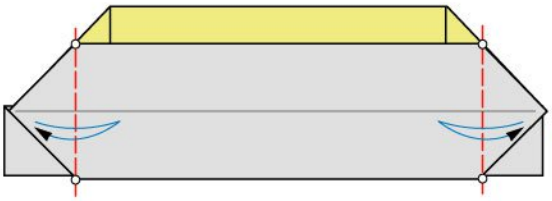
7

1 piega a valle e ruotate ripiegando a monte



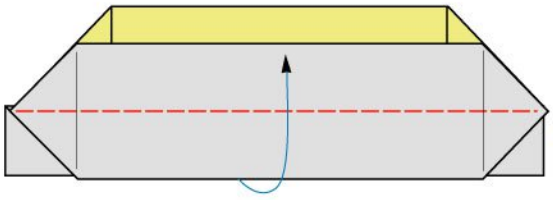
8

2 pieghe rovesce interne



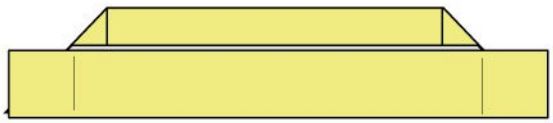
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2 pieghe a valle



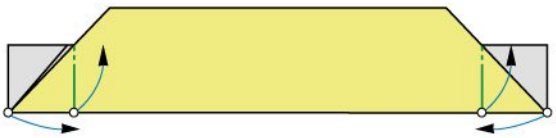
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Ruotate ripiegando a valle



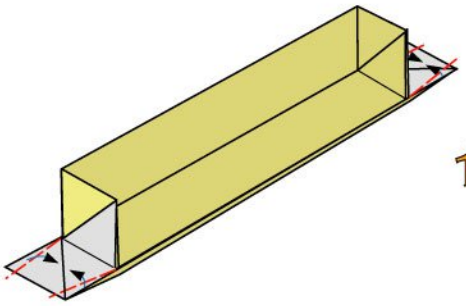
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Ribaltate



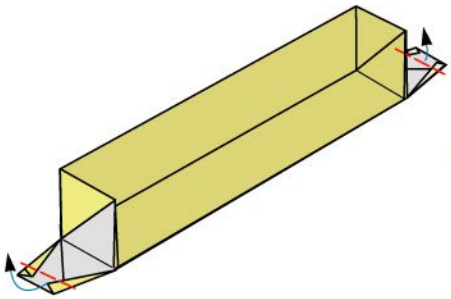
12

Ripiegando aprite 3D



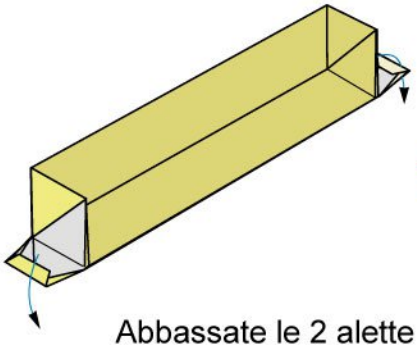
13

4 pieghe a valle e ruotate



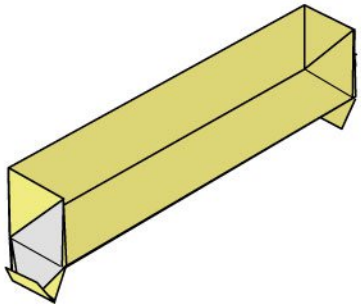
14

2 pieghe a valle e ruotate



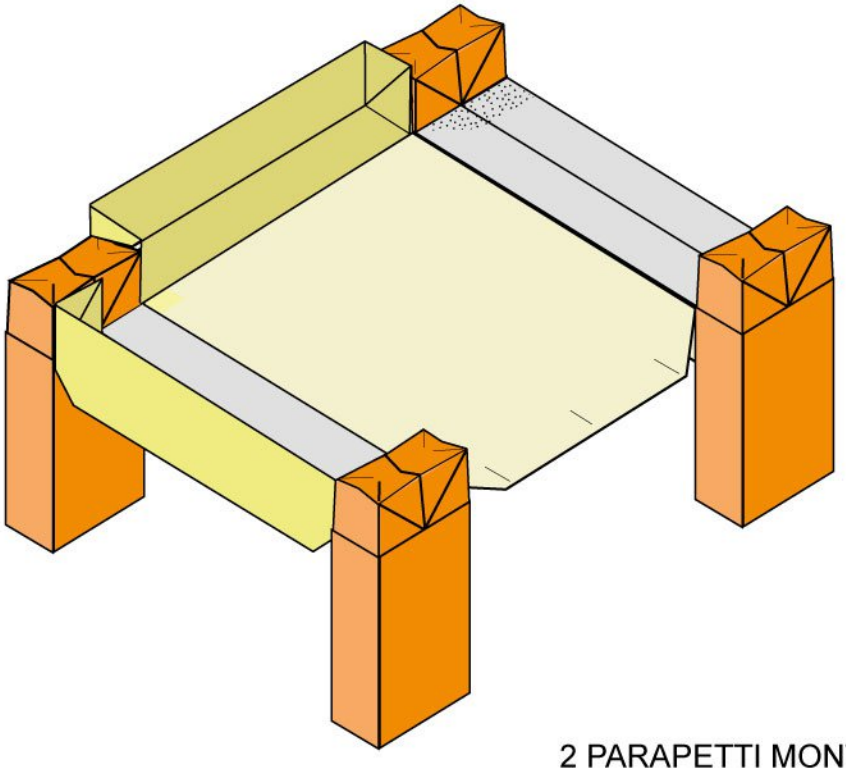
15

Abbassate le 2 alette



16

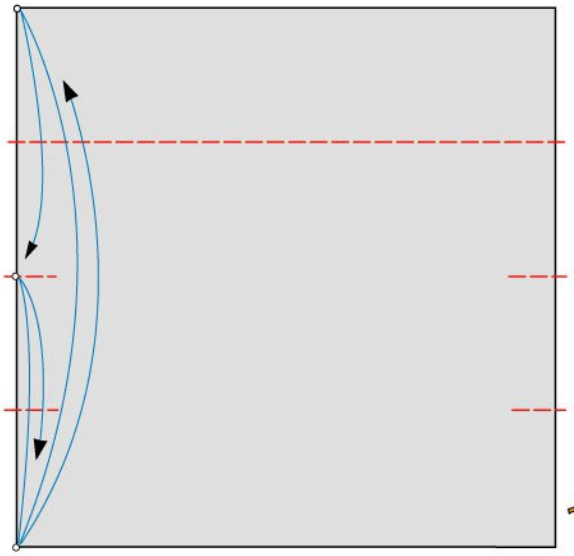
Parapetto ultimato



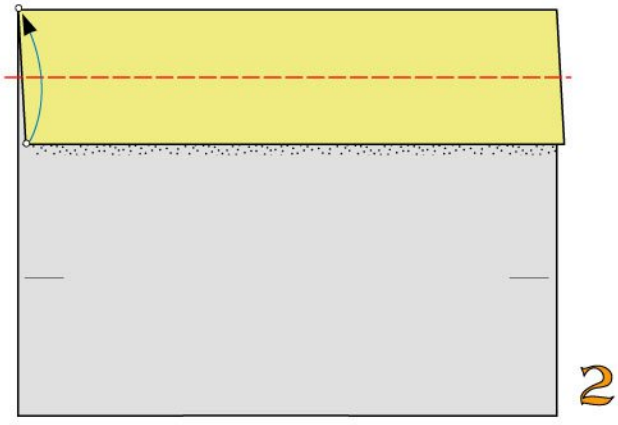
2 PARAPETTI MONTATI

POGGIOLO
con fioriera

Elemento architettonico di costruzione complessa, indicato per origamisti esperti.



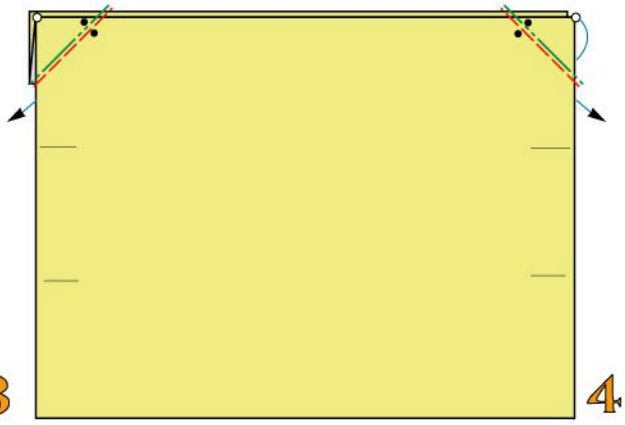
5 pieghe a valle e ruotate il bordo superiore



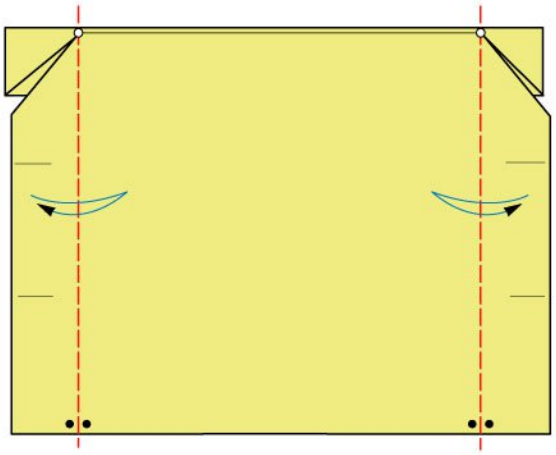
1 piega a valle solo sulla sup. in vista e ruotate il bordo superiore



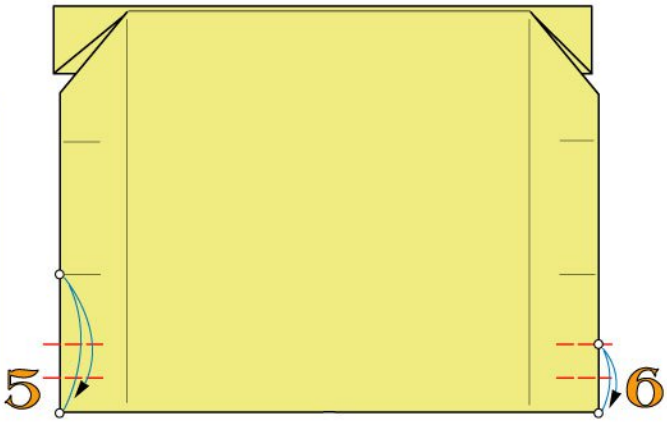
Ribaltate



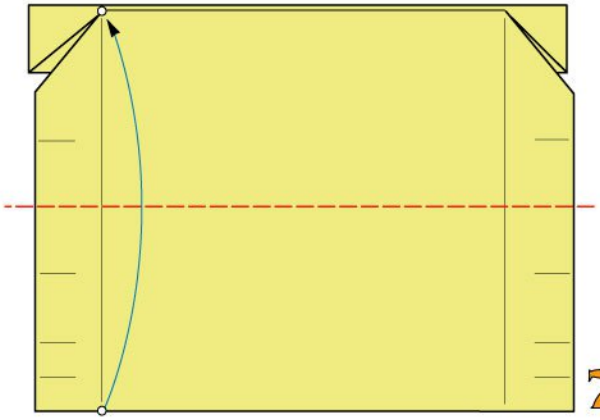
2 pieghe rovesce interne



2 pieghe bisettrici a valle



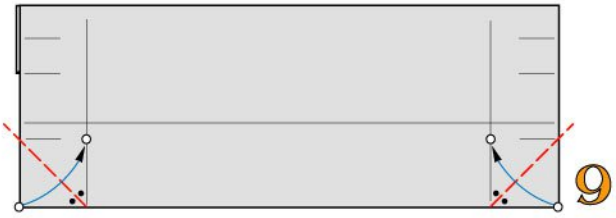
4 pieghe a valle



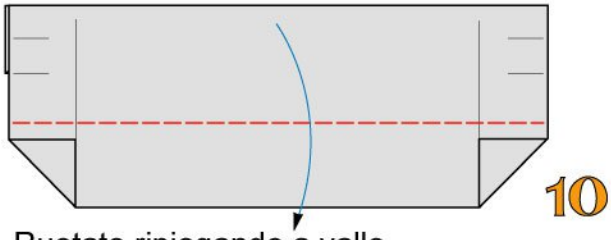
1 piega a valle e ruotate



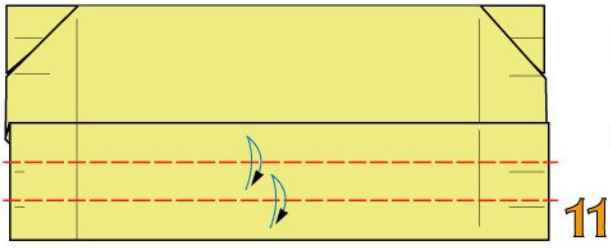
1 piega a valle solo sulla sup. in vista



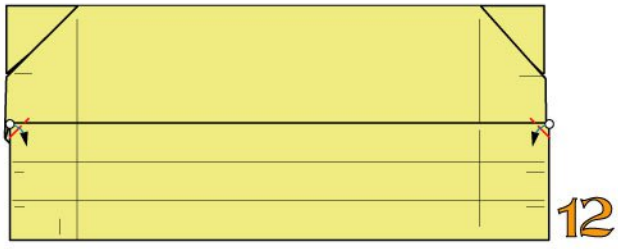
2 pieghe bisettrici a valle e ruotate



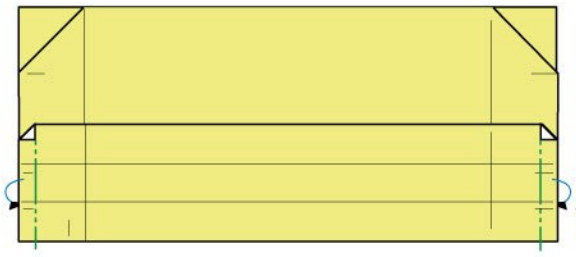
Ruotate ripiegando a valle



2 pieghe parallele a valle

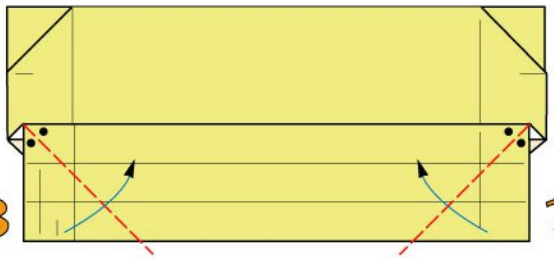


2 piccole pieghe a valle e ruotate



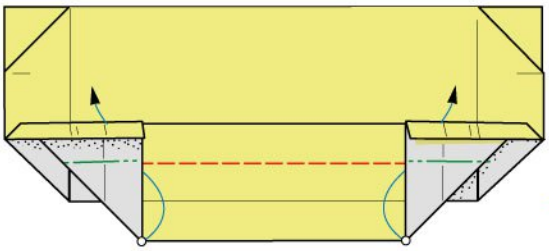
13

2 pieghe a monte e ruotate



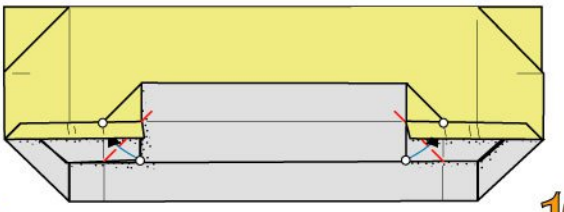
14

2 pieghe bisettrici a valle e ruotate



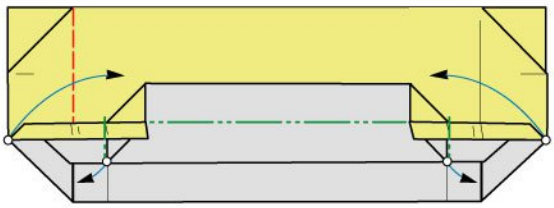
15

2 pieghe rovesce interne



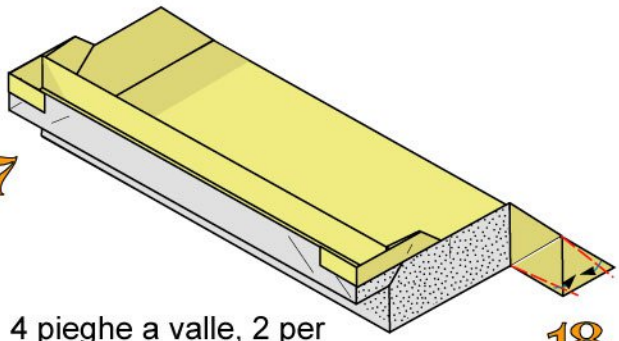
16

2 pieghe a valle e ruotate



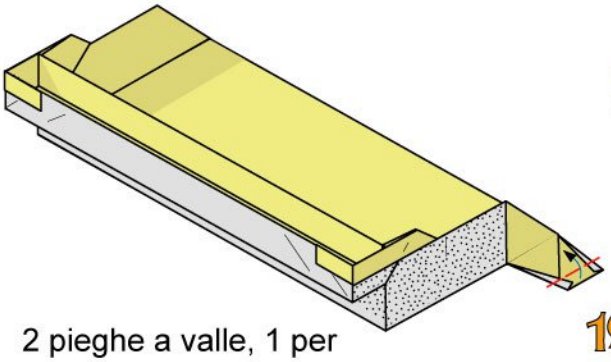
17

Ripiegando a valle ed a monte aprite 3D



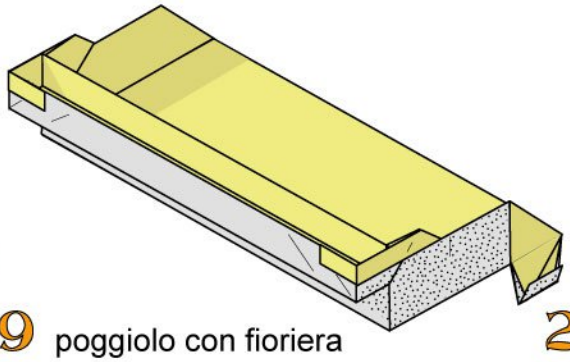
4 pieghe a valle, 2 per appendice e ruotate

18



2 pieghe a valle, 1 per appendice e ruotate

19



poggiolo con fioriera ultimato

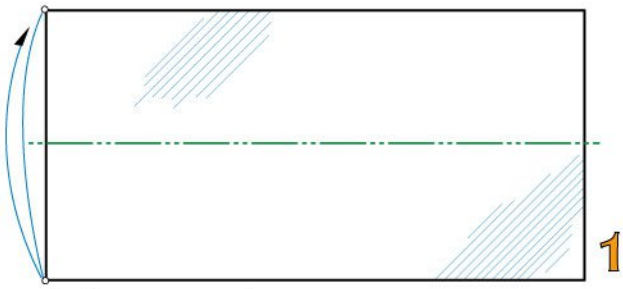
20

POGGIOLO
con parapetto in cristallo

Di costruzione elaborata, si realizza unendo due elementi: solaio e parapetto

COSTRUZIONE DEL PARAPETTO

Adoperate un mezzo foglio quadrato di plastica leggera o acetato sottile



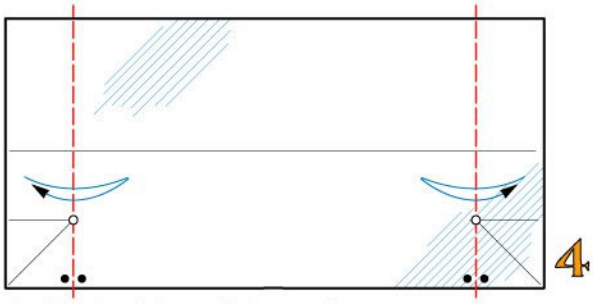
1 piega a monte



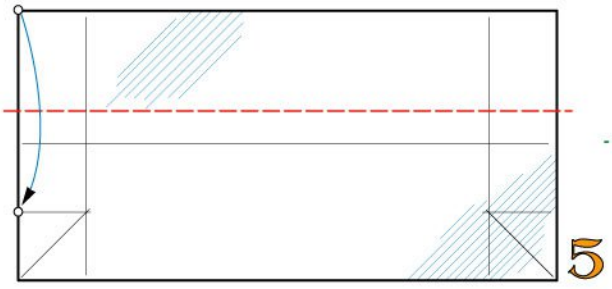
2 pieghe bisettrici a valle



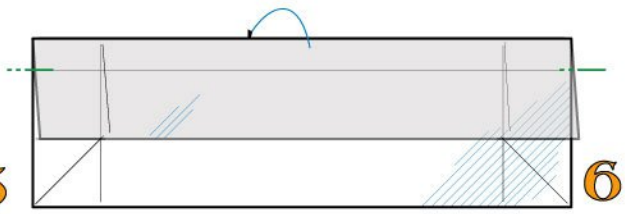
2 pieghe a valle



2 pieghe bisettrici a valle



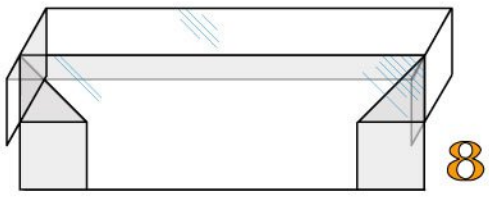
1 piega a valle e ruotate



Ruotate ripiegando a monte

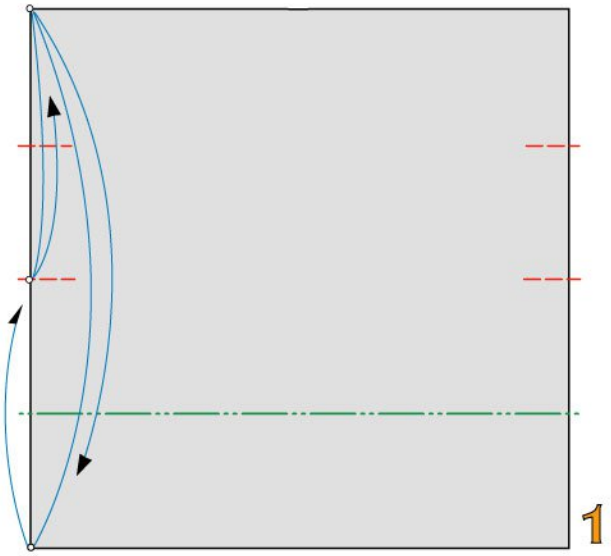


2 pieghe bisettrici a monte e, ripiegando a valle, ruotate 3D



Parapetto in cristallo ultimato

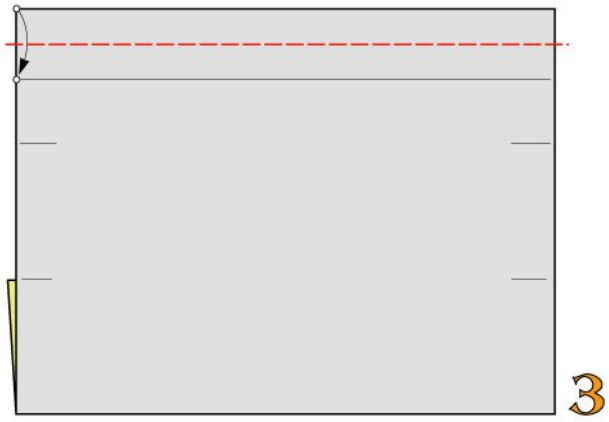
COSTRUZIONE DEL SOLAIO DEL POGGIOLO



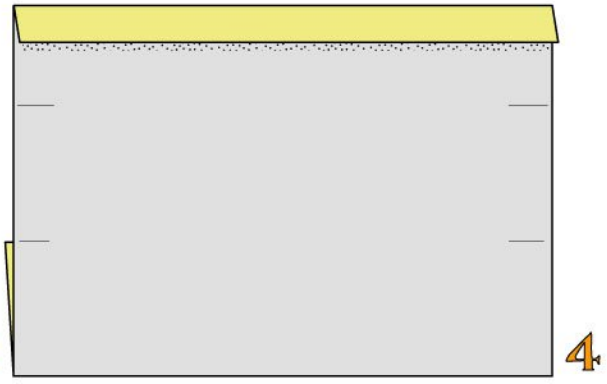
4 pieghe a valle, 1 a monte e ruotate il bordo inferiore



1 piega a valle



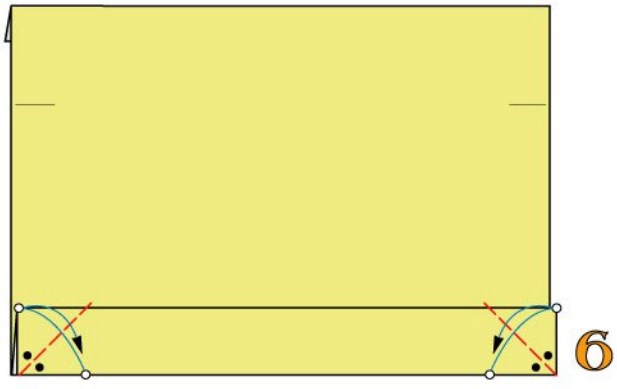
1 piega a valle e ruotate



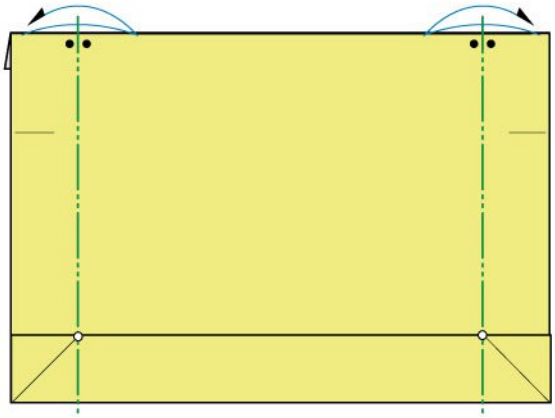
Ribaltate



1 piega a valle solo sulla sup. in vista e ruotate

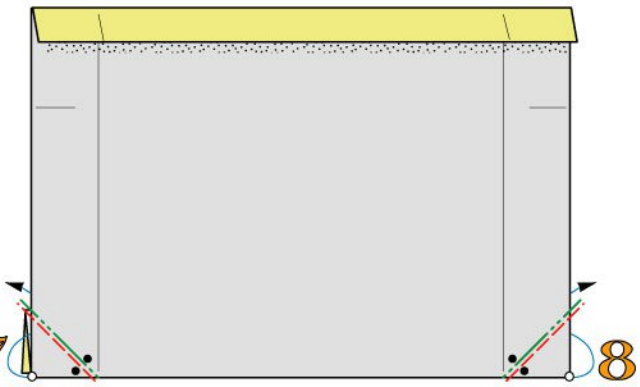


2 pieghe bisettrici a valle



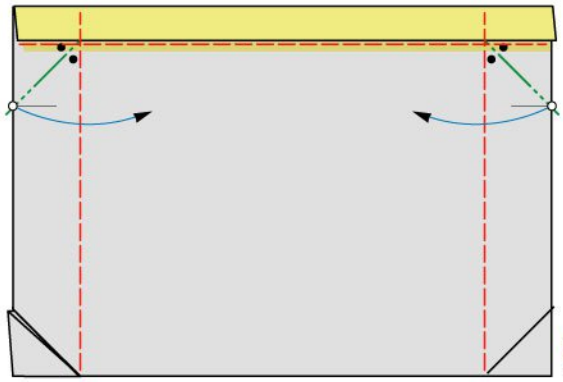
7

2 pieghe bisettrici a monte e ribaltate



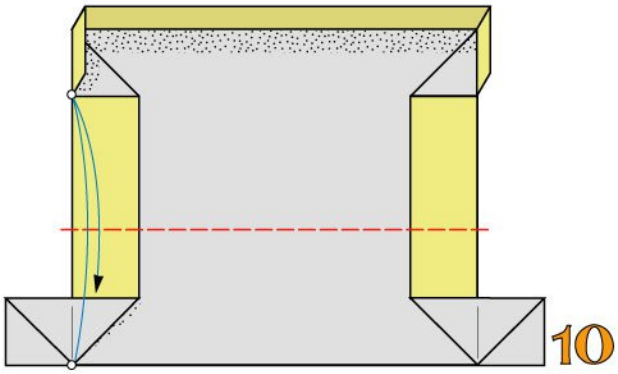
8

2 pieghe rovesce interne



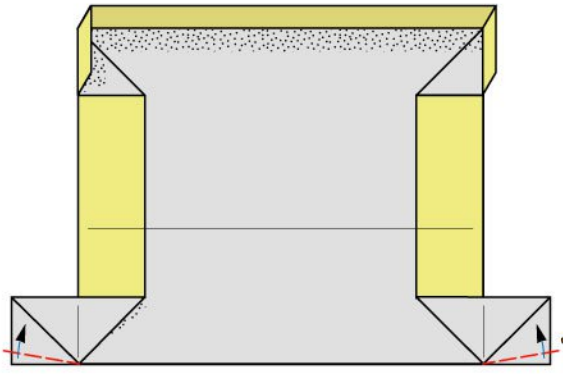
9

2 pieghe bisettrici a monte e, ripiegando a valle, ruotate 3D



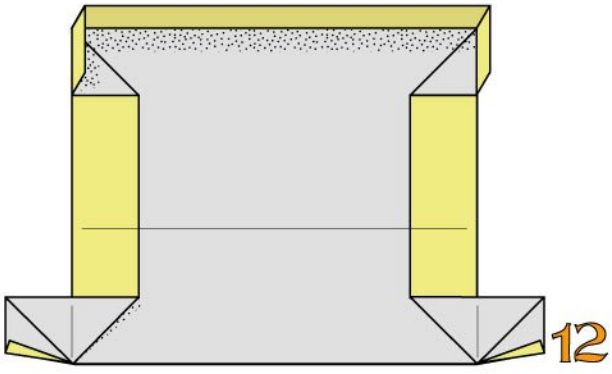
10

1 piega a valle



11

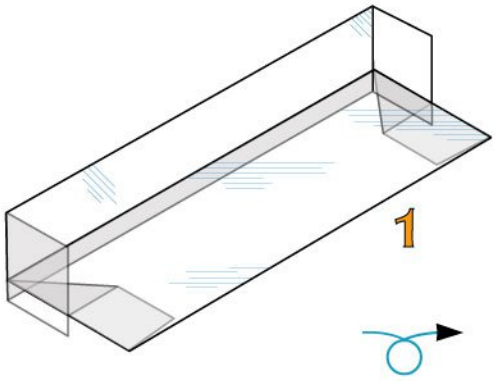
2 pieghe a valle e ruotate



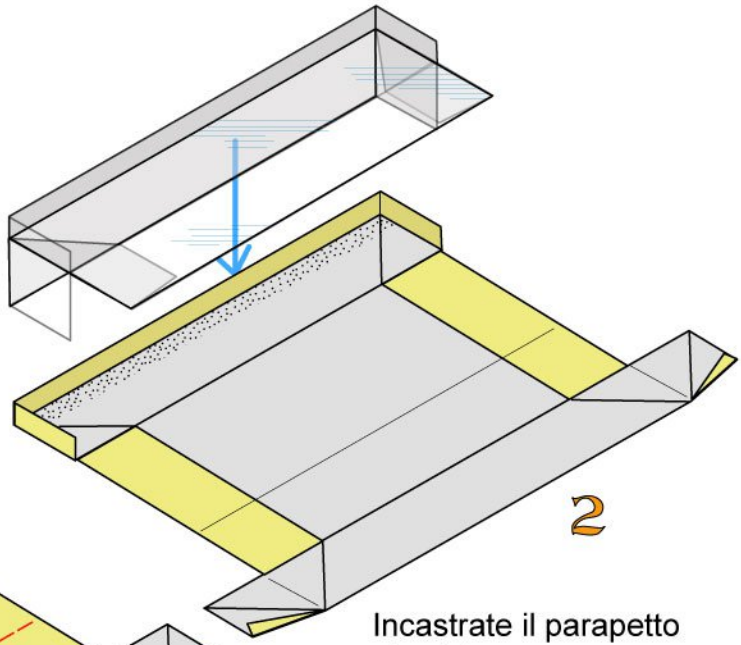
12

Solaio di poggiolo ultimato

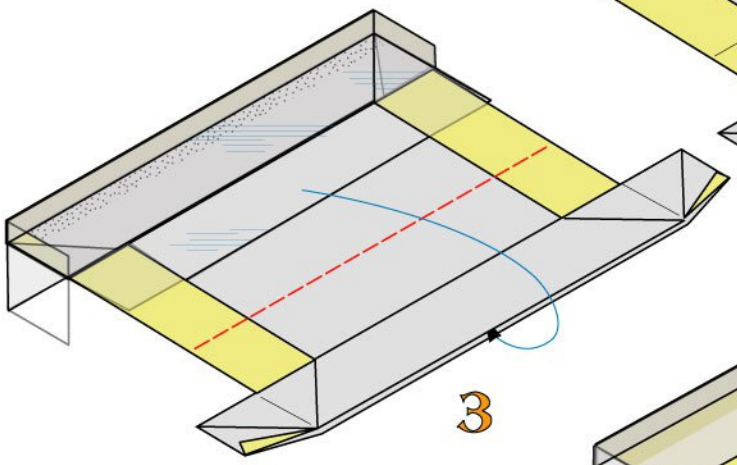
UNIONE DI PARAPETTO E SOLAIO



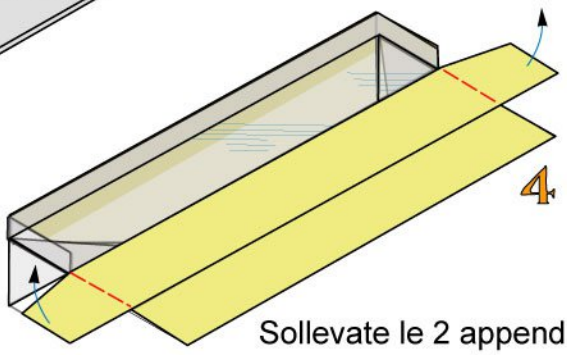
Ribaltate il parapetto



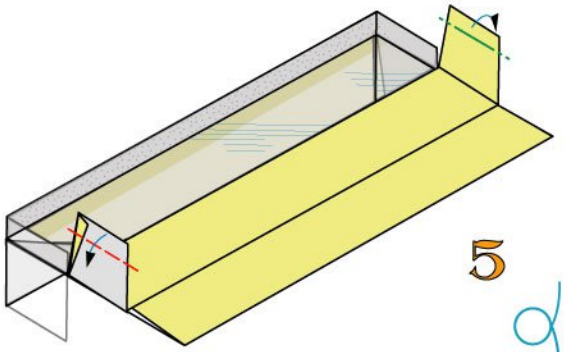
Incastrate il parapetto
al solaio



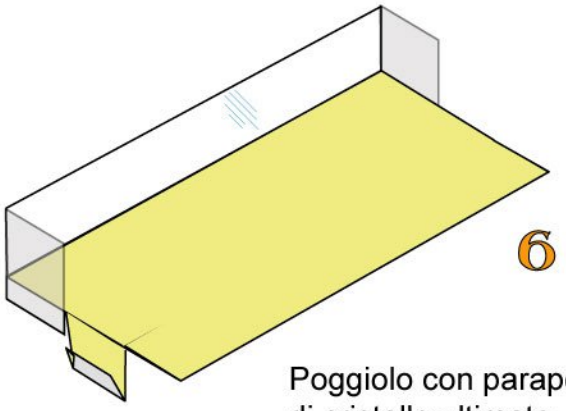
Intascate il bordo del parapetto
entro il solaio



Sollevate le 2 appendici
del solaio



2 pieghe a valle, ruotate e ribaltate



Poggiolo con parapetto
di cristallo ultimato

FONDAZIONI

Più che fondazioni nel nostro caso si tratta di collegamenti per mantenere in posizione i pilastri del pianoterra.

Si costruscono successivamente al primo piano per adattarsi alle misure del telaio, rispetto al quale fungono da basamento, e sono dotate di giunti flessibili

Gli elementi base sono 3: trave di fondazione larga, giunto, trave di fondazione stretta.

TRAVE DI FONDAZIONE LARGA



2 piccole pieghe a valle



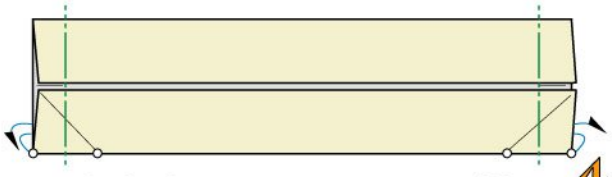
2 pieghe bisettrici a valle



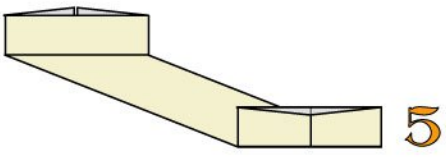
2 pieghe a valle e ruotate

A questo punto ci sono 2 possibilità: nel caso non ci siano pareti soprastanti, cioè nel caso ci sia un porticato vuoto, la fondazione si monta con l'apertura verso il basso, secondo le figure 4 e 5;

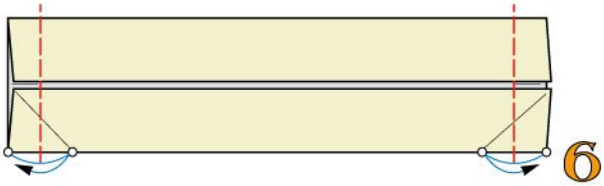
Se invece bisogna fissare delle pareti, si piega con l'apertura in alto, per avere una tasca disponibile per l'incastro, vedi figure 6 e 7.



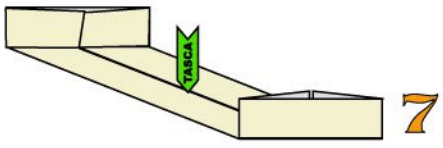
2 pieghe a monte e ruotate 3D



Fondazione larga per portico ultimata



2 pieghe a valle e ruotate 3D



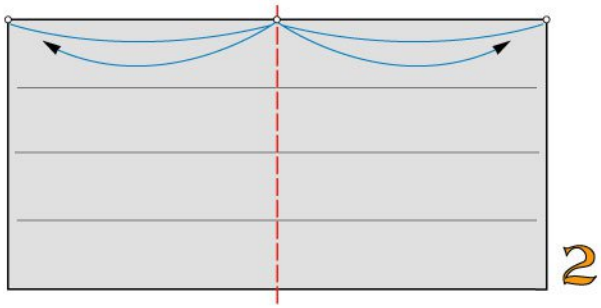
Fondazione larga per parete ultimata

GIUNTO FLESSIBILE

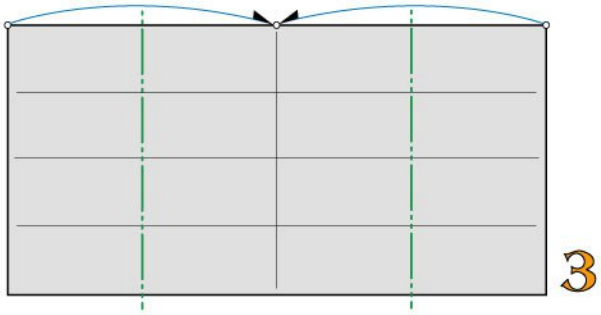
Ho ritenuto necessario studiare un sistema di collegamento della base dei pilastri dimensionalmente flessibile, dato che le misure reali del telaio per vari fattori non sono precedentemente stabilibili con certezza. L' uso di questo giunto permette alla fondazione di adattarsi indifferentemente ad ogni campata del telaio.



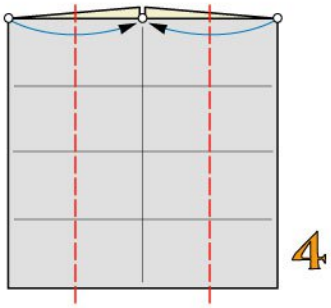
3 pieghe a valle



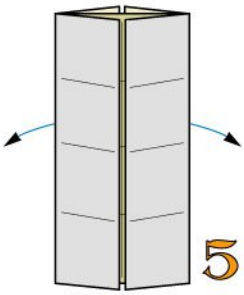
1 piega a valle



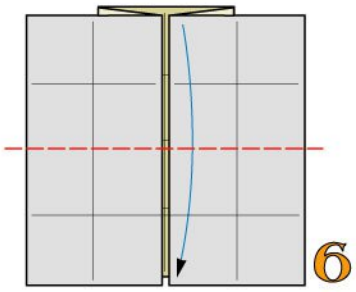
2 pieghe a monte e ruotate



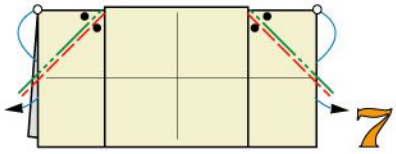
2 pieghe a valle e ruotate



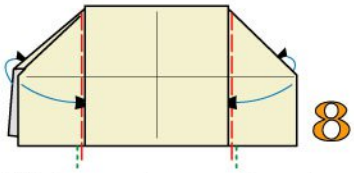
Riaprite



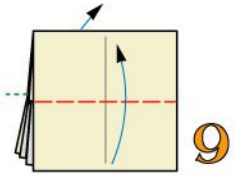
1 piega a valle e ruotate



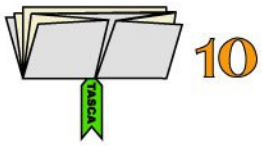
2 pieghe rovesce interne



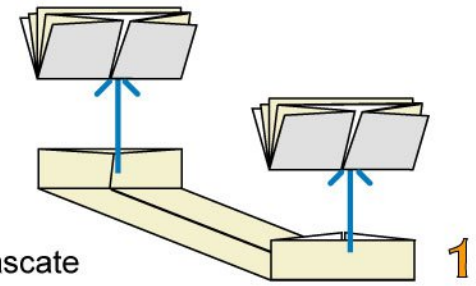
Ripiegando a valle ed a monte intascate le 4 alette



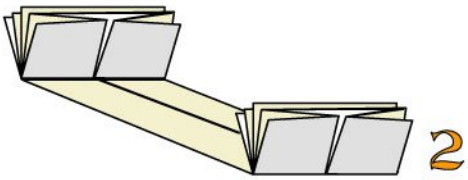
Aprite ripiegando a valle



MONTAGGIO DI GIUNTI SULLA FONDAZIONE LARGA



Intascate 1



2

TRAVE DI FONDAZIONE STRETTA

Anche in questo caso ci sono 2 possibilità: nel caso non ci siano pareti soprastanti, cioè nel caso ci sia un porticato vuoto, la fondazione si monta con l'apertura verso il basso, secondo le figure da 1 a 4.

Se invece bisogna fissare delle pareti, si piega con l'apertura laterale, per avere una tasca disponibile per l'incastro, vedi figure 5,6 e 7.



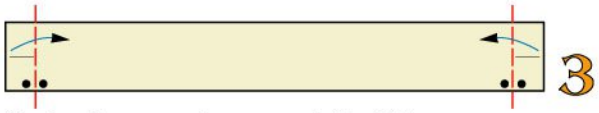
1

2 piccole pieghe a valle



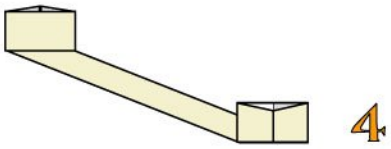
2

2 pieghe a valle, ruotate e ribaltate



3

2 pieghe a valle e ruotate 3D.
La distanza fra le pieghe deve essere la stessa della campata del solaio



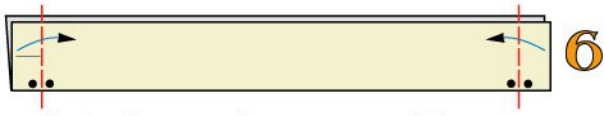
4

Fondazione larga per portico ultimata



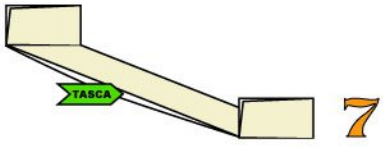
5

1 piega a valle e ruotate



6

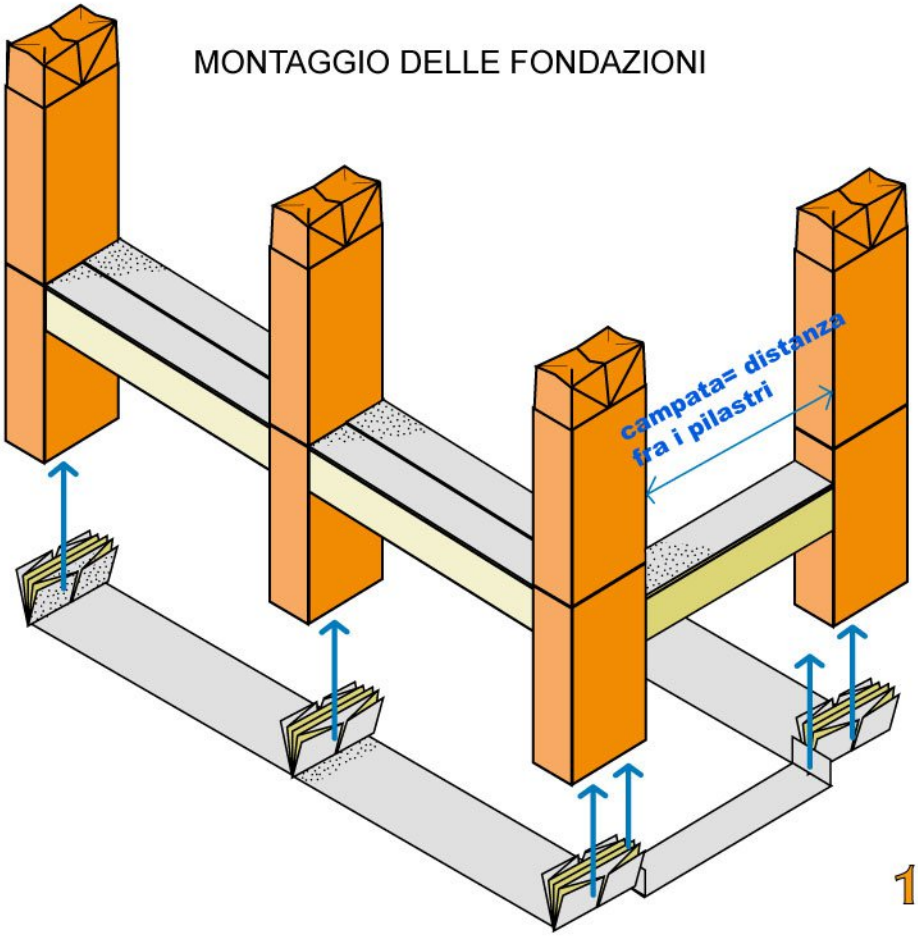
2 pieghe a valle e ruotate 3D.
La distanza fra le pieghe deve essere la stessa della campata del solaio



7

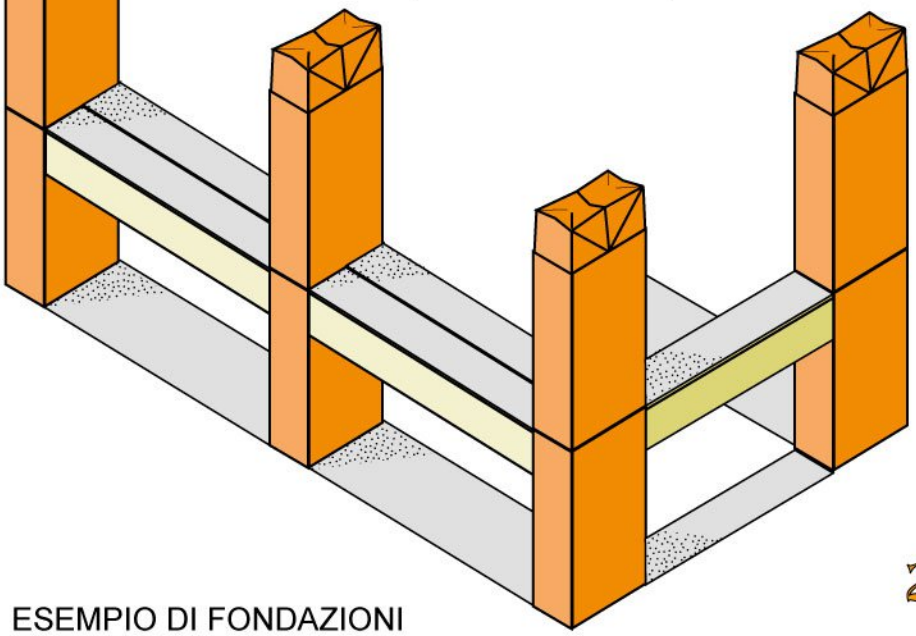
Fondazione larga per parete ultimata

MONTAGGIO DELLE FONDAZIONI



1

Innanzitutto inserite nei pilastri le estremità della fondazione stretta, poi collegate le fondazioni larghe ed unitele inserendone gli estremi in un giunto flessibile. Infine inserite i giunti nei pilastri, magari aiutandovi con un piccolo cacciavite, bloccando il tutto.

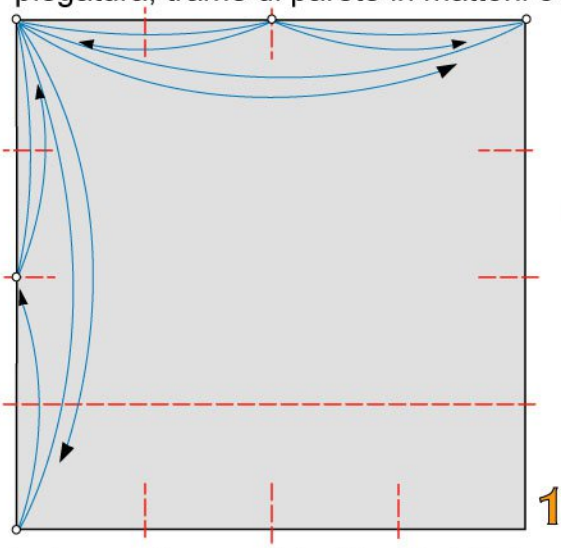


2

ESEMPIO DI FONDAZIONI
COLLEGATE AL TELAIO

PARETE piena 1

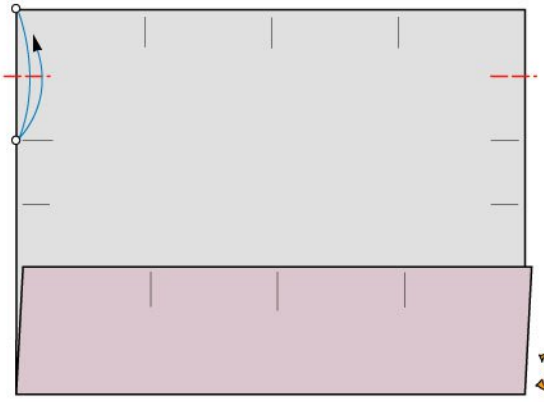
Nell'architettura moderna le pareti hanno parzialmente perso la loro originaria funzione strutturale per assumerne una di una semplice chiusura degli spazi. Nel nostro caso ad una parete piena si può sostituire una parete vetrata adoperando un foglio di sottile plastica trasparente od acetato.
Magnifici effetti si possono ottenere stampando sul foglio, prima della piegatura, trame di parete in mattoni o pietra.



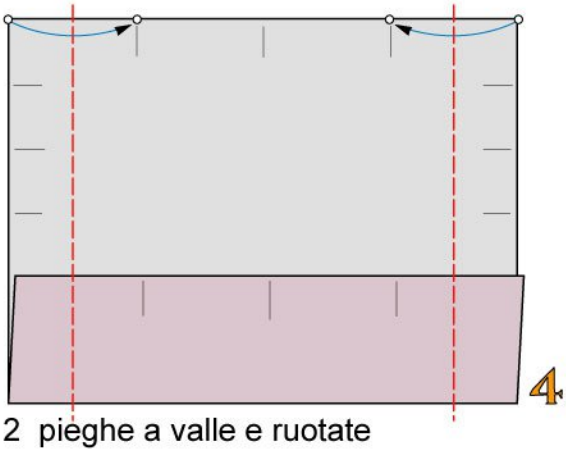
11 pieghe a valle e ruotate il bordo inferiore



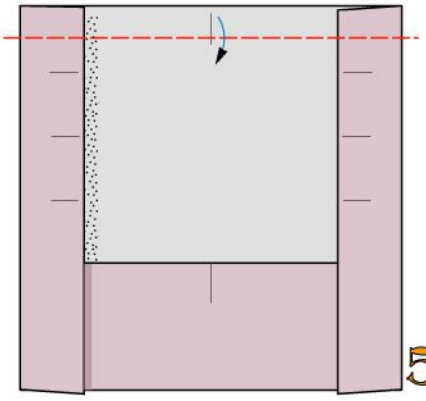
2 piccole pieghe a valle



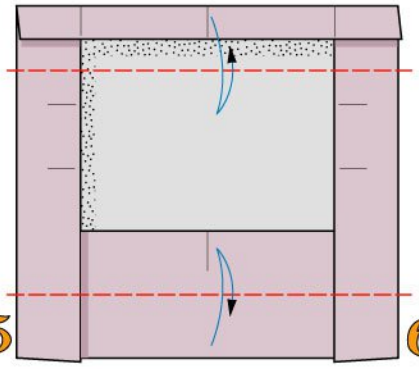
2 piccole pieghe a valle



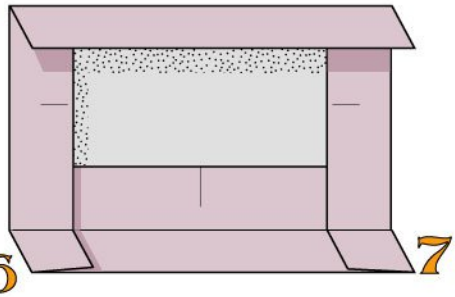
2 pieghe a valle e ruotate



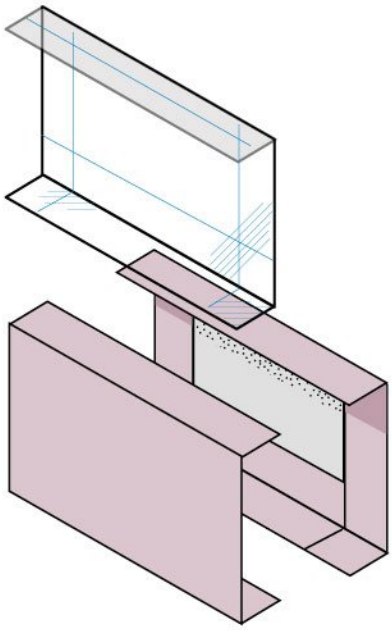
1 piega a valle e ruotate

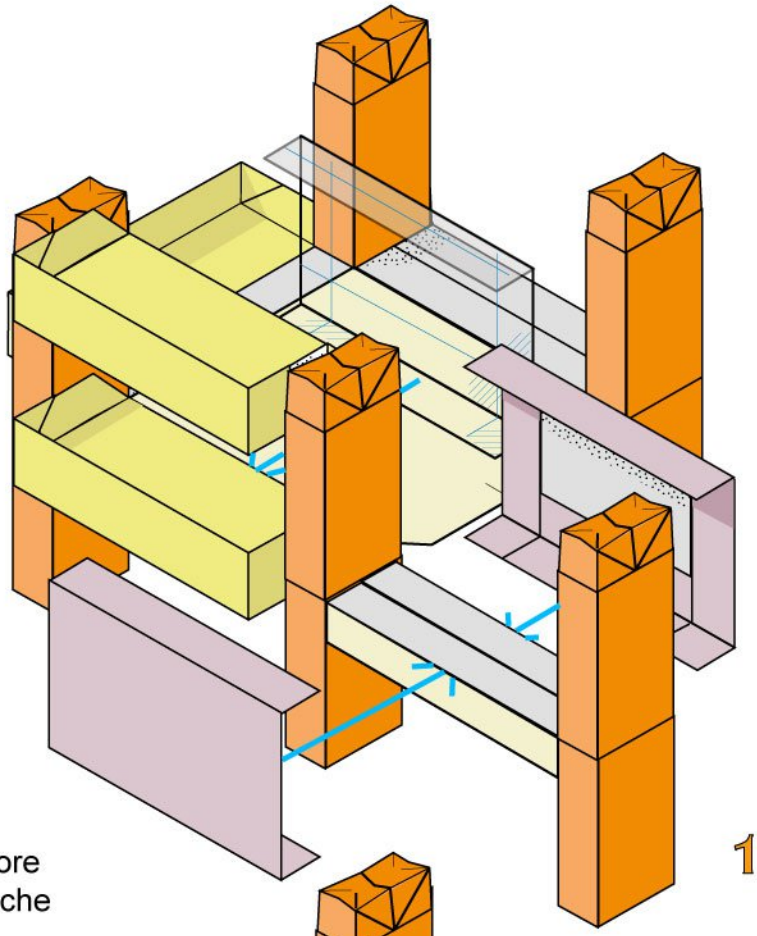


2 pieghe a valle



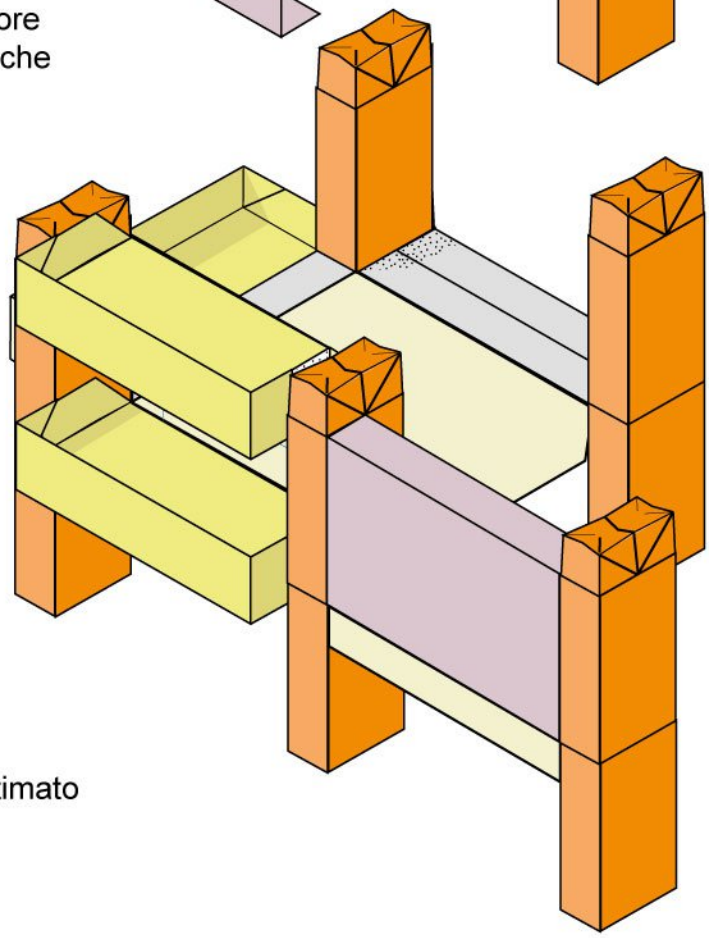
Parete piena 1 ultimata





Incastrate le pareti nelle tasche delle travi. Se volete dare spessore alle pareti fissate un pannello anche all'interno

1

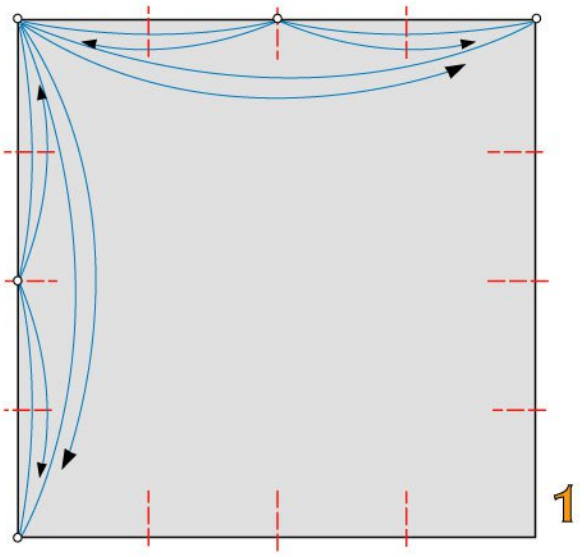


Montaggio di parete e vetrata ultimato

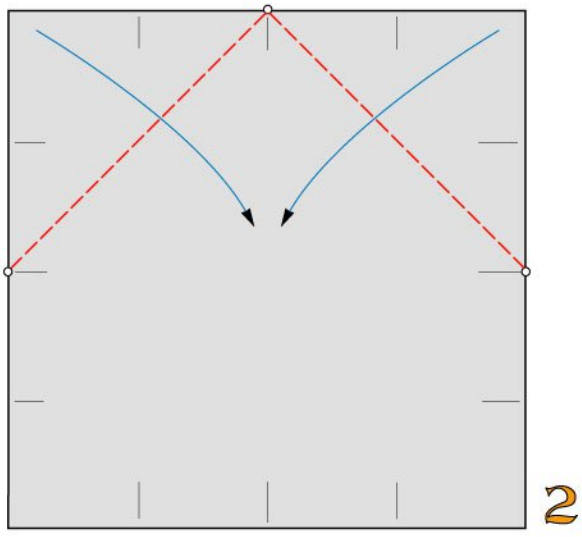
2

PARETE piena 2

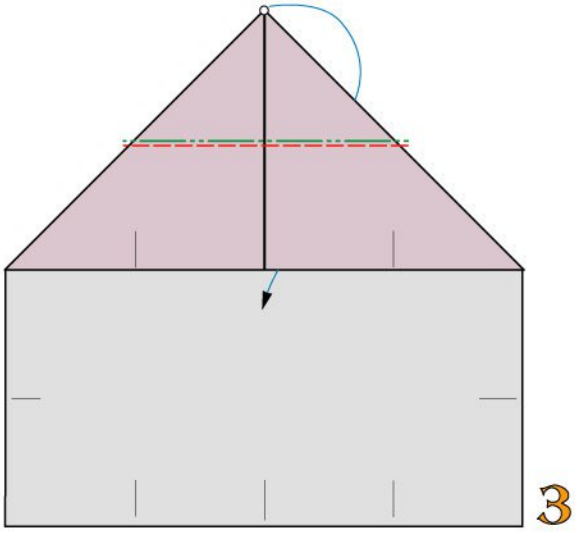
Realizziamo un altro tipo di parete piena



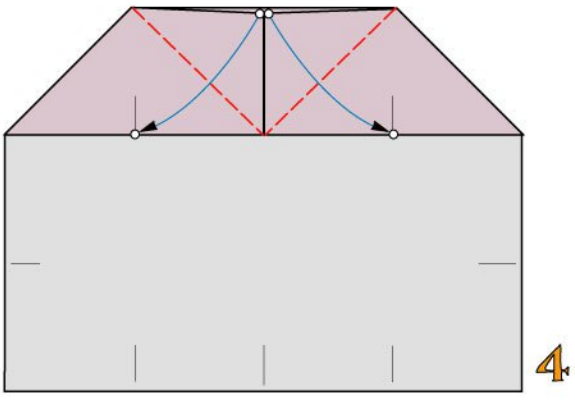
12 piccole pieghe a valle



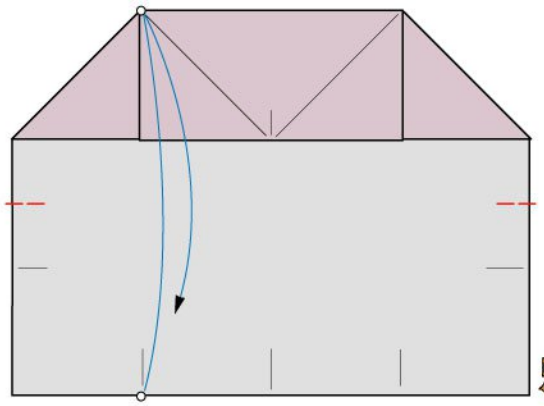
2 pieghe a valle e ruotate



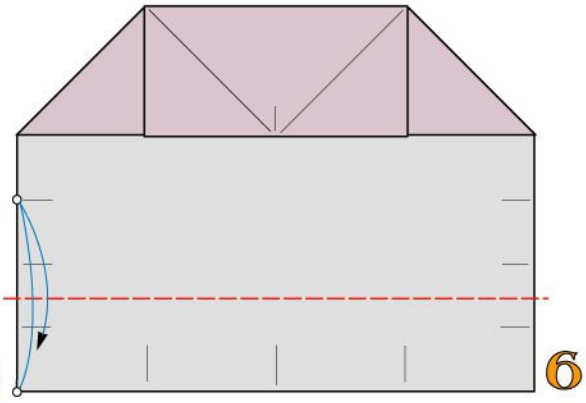
1 piega rovescia interna



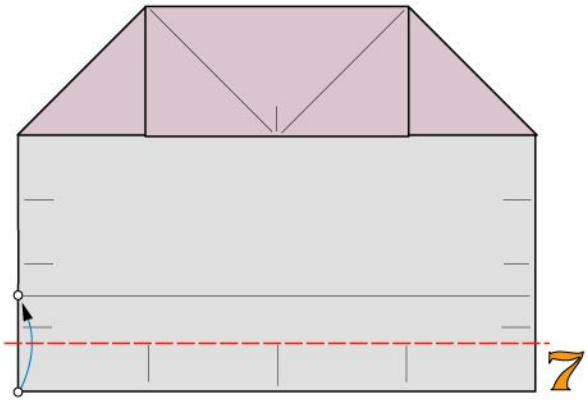
2 pieghe a valle e ruotate



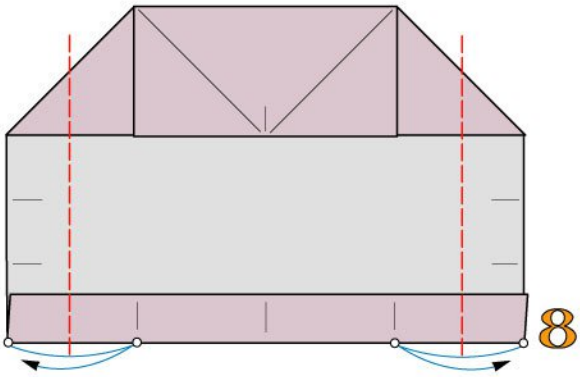
2 piccole pieghe a valle



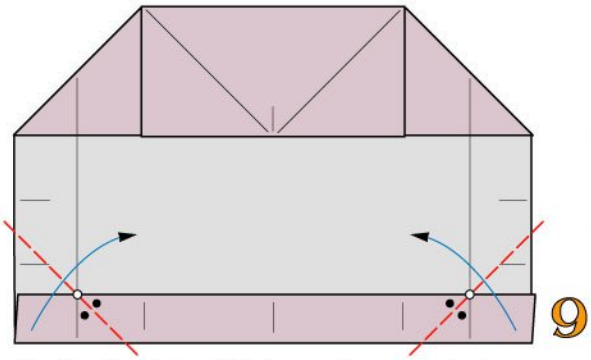
1 piega a valle



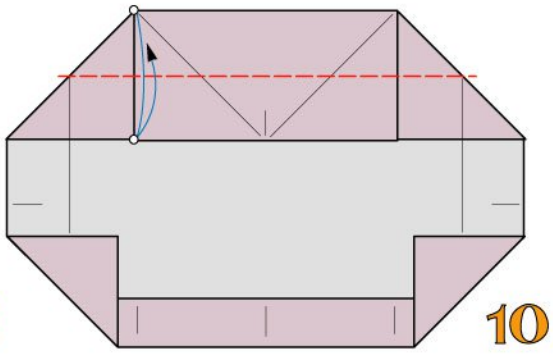
1 piega a valle e ruotate



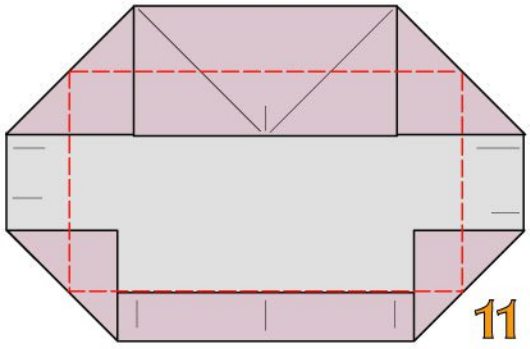
2 pieghe a valle



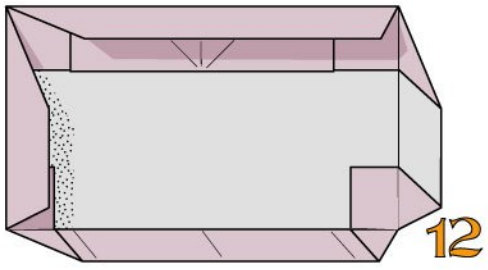
2 pieghe bisettrici a valle e ruotate



1 piega a valle



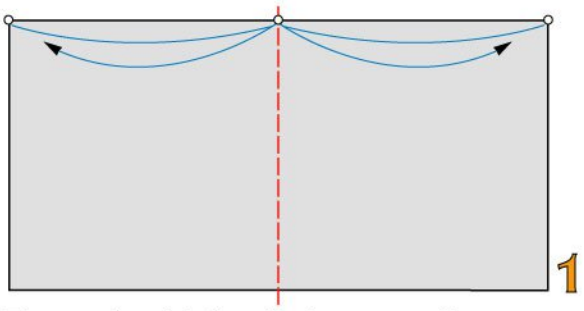
4 pieghe a valle e ruotate 3D



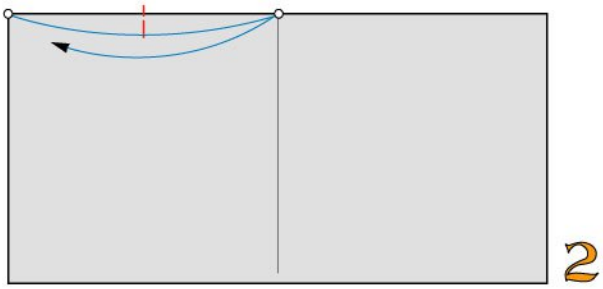
Parete piena 1 ultimata

PARETE con 1 finestra

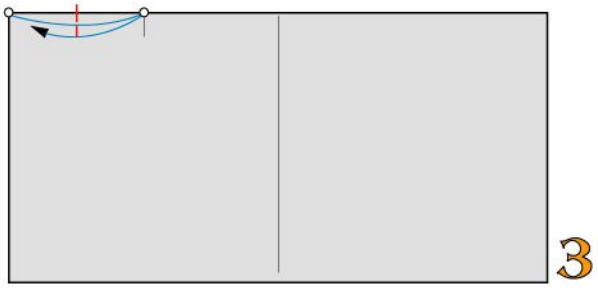
Questo pannello è dotato di un'apertura di grandi dimensioni e può essere montato come finestra fra 2 pilastri oppure, ribaltato, come porta su un poggiolo.
Si realizza unendo 2 elementi simmetrici ricavati dai soliti fogli rettangolari.



Elemento sinistro: 1 piega a valle



1 piccola piega a valle



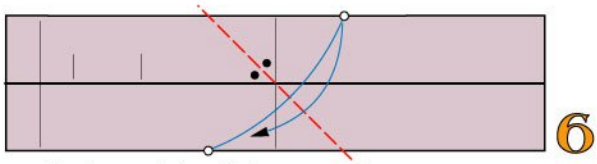
1 piccola piega a valle



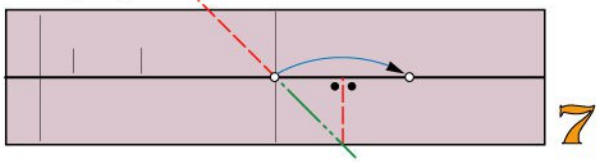
1 piega a valle



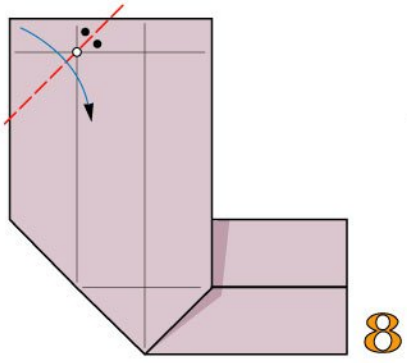
3 pieghe a valle e ruotate



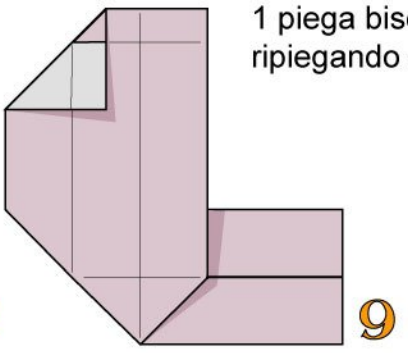
1 piega bisettrice a valle



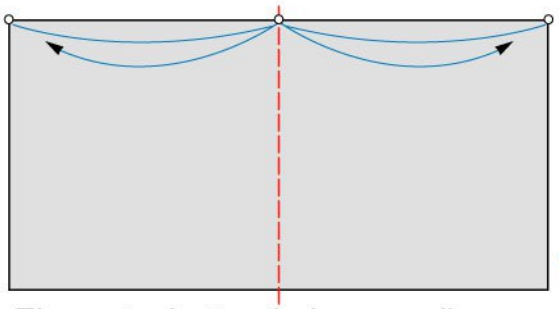
1 piega bisettrice a valle e ruotate ripiegando a monte



1 piega bisettrice a valle e ruotate

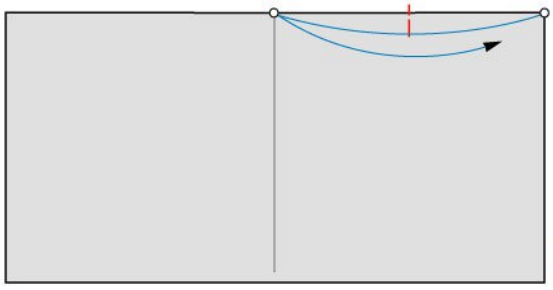


Elemento sinistro ultimato



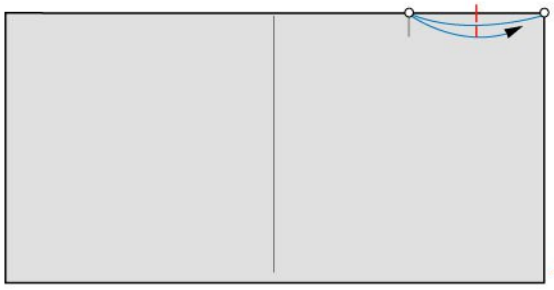
1

Elemento destro: 1 piega a valle



2

1 piccola piega a valle



3

1 piccola piega a valle



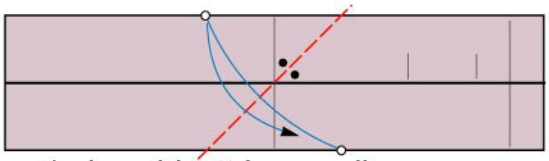
4

1 piega a valle



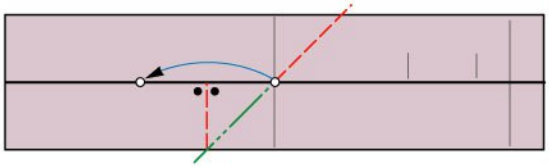
5

3 pieghe a valle e ruotate



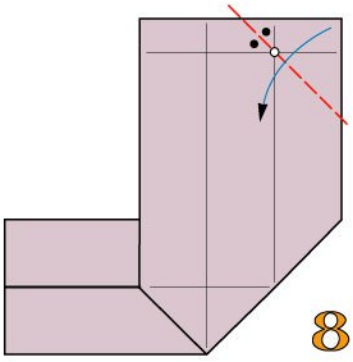
6

1 piega bisettrice a valle



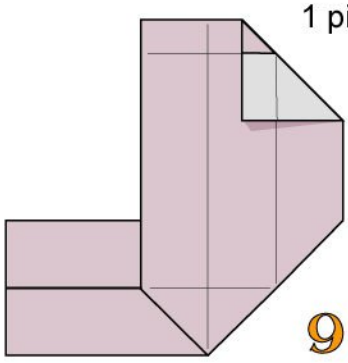
7

1 piega bisettrice a valle e ruotate
ripiegando a monte



8

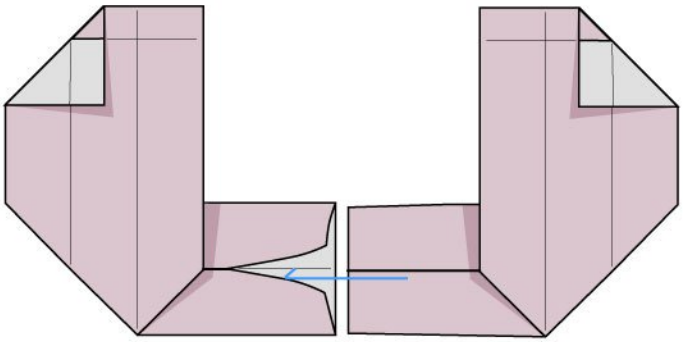
1 piega bisettrice a valle e ruotate



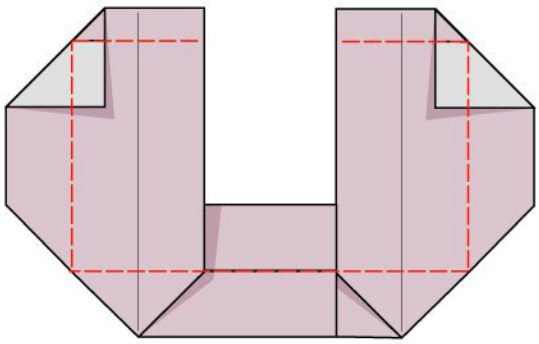
9

Elemento sinistro ultimato

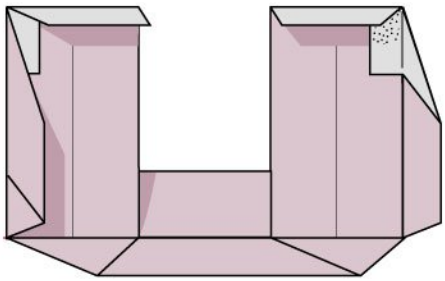
UNIONE DEI 2 ELEMENTI



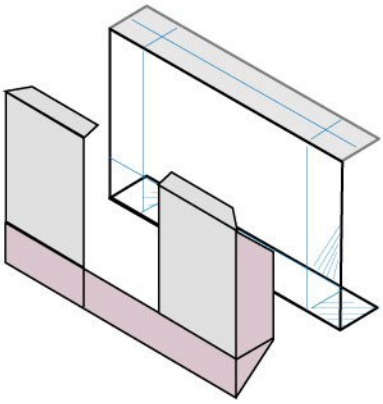
Intascate le parti orizzontali fino in fondo



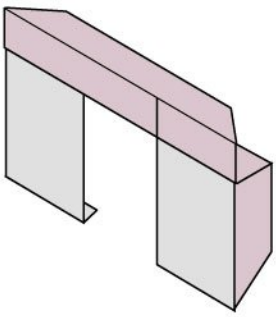
5 pieghe a valle e ruotate 3D



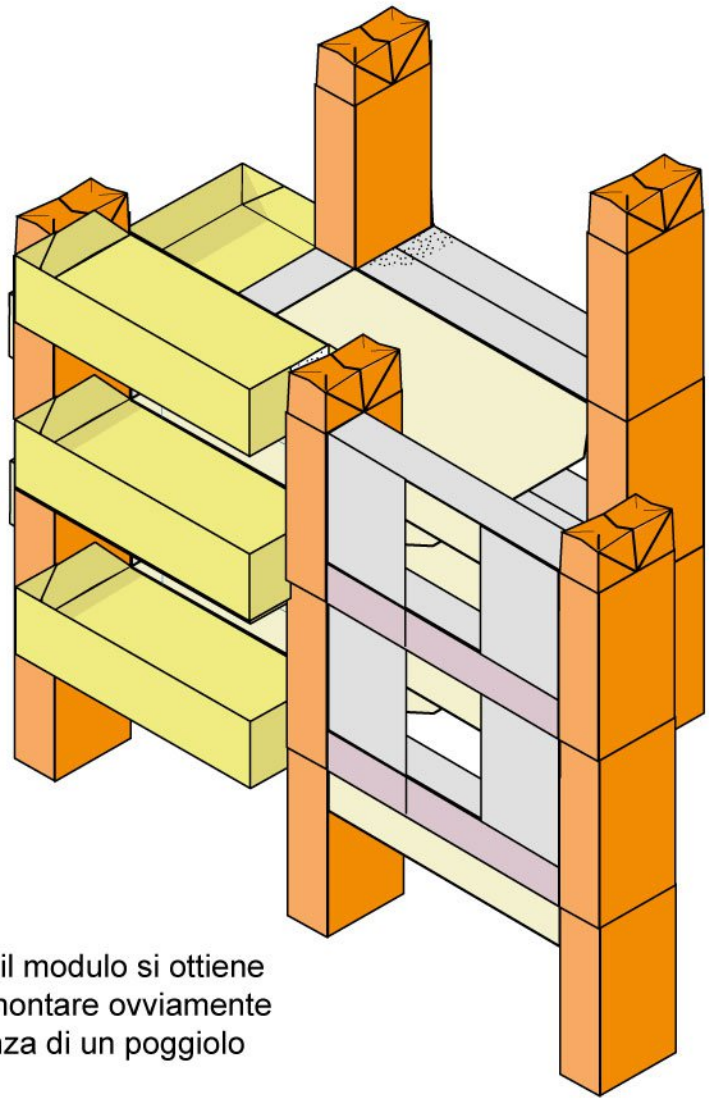
Parete con grande finestra ultimata



È possibile inserire all'interno una parete trasparente per simulare un serramento con vetro

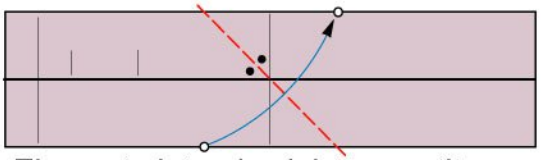


Capovolgendo il modulo si ottiene una porta, da montare ovviamente in corrispondenza di un poggiolo

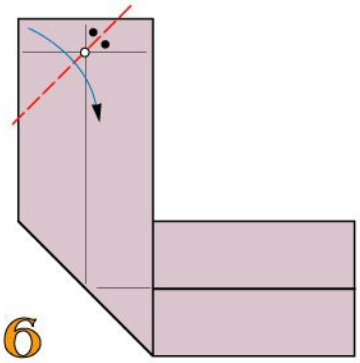


PARETE con 2 finestre

Questo pannello, dotato di 2 aperture, può essere montato come finestre fra 2 pilastri oppure, ribaltato, come porte su un poggiolo.
Si realizza unendo 3 elementi ricavati da 3 fogli rettangolari, 2 laterali uguali ma simmetrici ed 1 centrale.

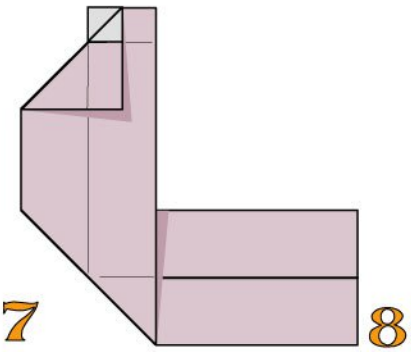


Elemento laterale sinistro: partite dalla fig. n. 5 di el. sin. di parete con una finestra.
1 piega bisettrice a valle e ruotate



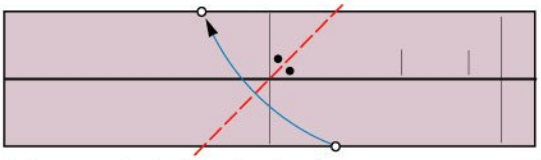
6

1 piega bisettrice a valle e ruotate

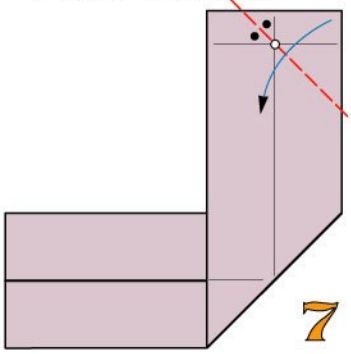


7

elemento laterale sinistro ultimato

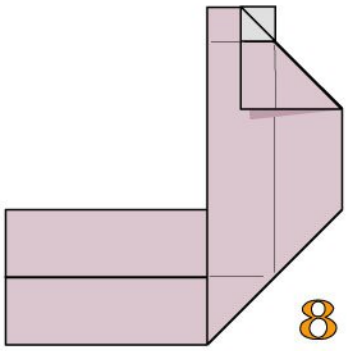


Elemento laterale destro.
1 piega bisettrice a valle e ruotate



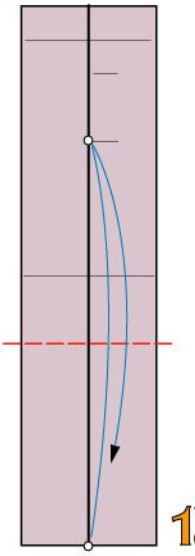
6

1 piega bisettrice a valle e ruotate



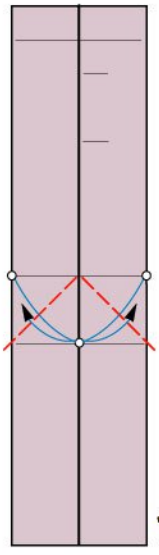
7

elemento laterale destro ultimato



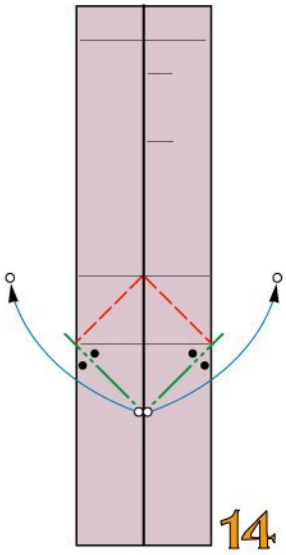
12

Elemento centrale. Partite dalla fig. n.5 di "Parete con una finestra".
1 piega a valle



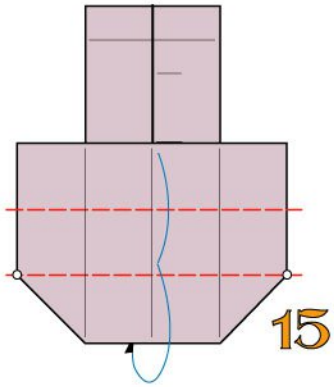
13

2 pieghe a valle

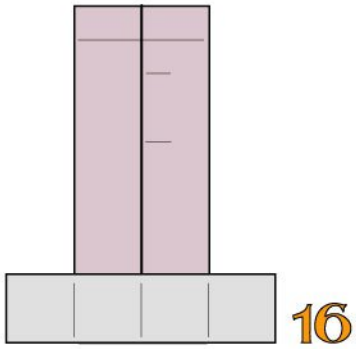


14

2 pieghe a monte e, ripiegando a valle, ruotate aprendo

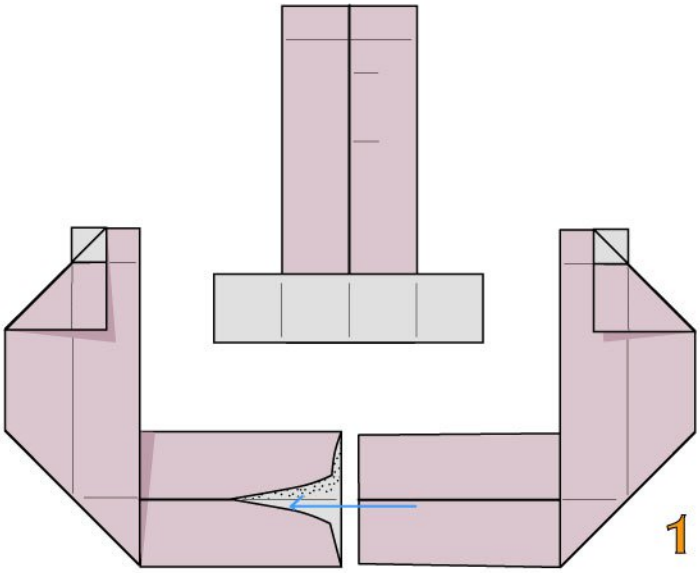


2 pieghe a valle e ruotate

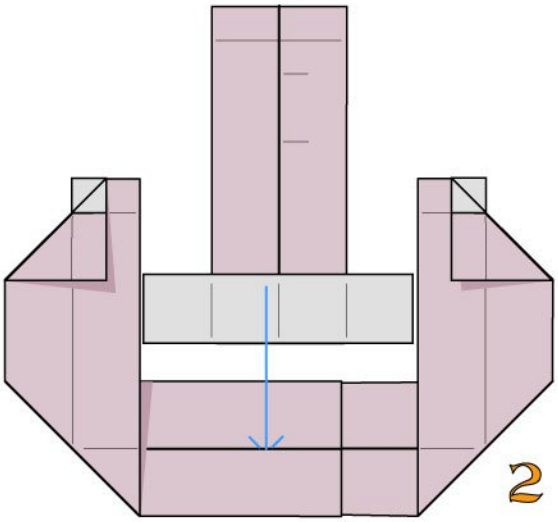


elemento centrale ultimato

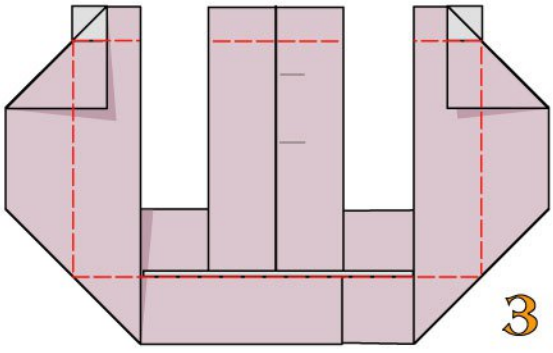
UNIONE DEI 3 ELEMENTI



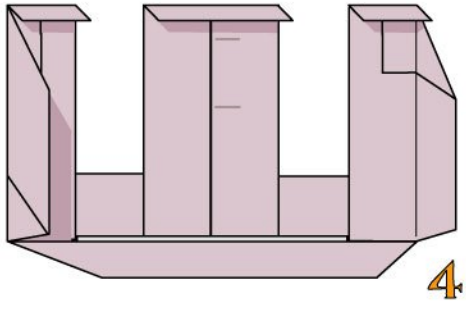
Intascate le parti orizzontali



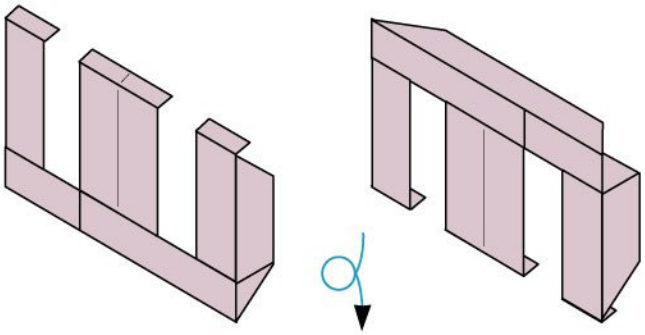
Intascate l' elemento centrale



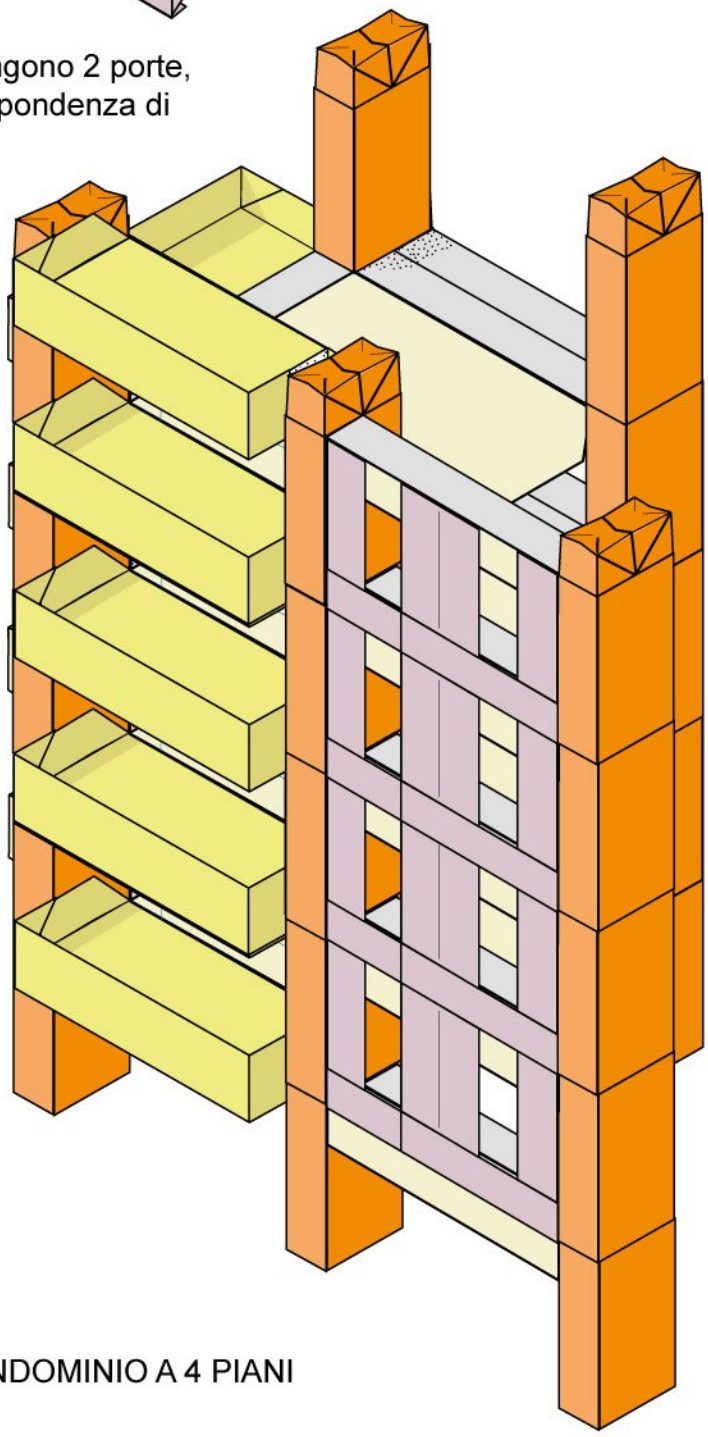
6 pieghe a valle e ruotate 3D



Parete con 2 finestre ultimata



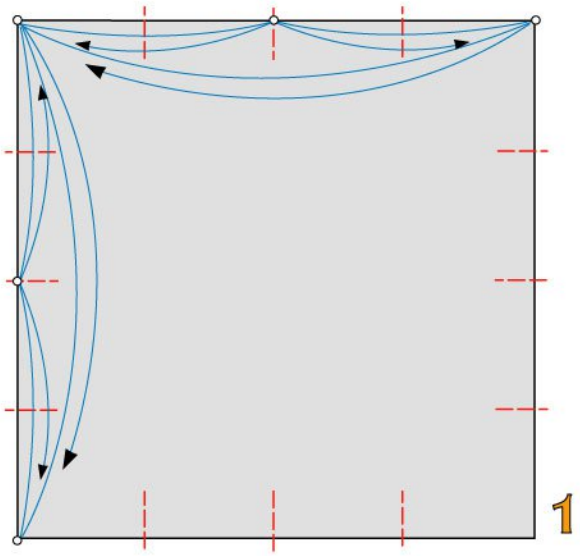
Capovolgendo il modulo si ottiengono 2 porte, da montare ovviamente in corrispondenza di un poggiolo



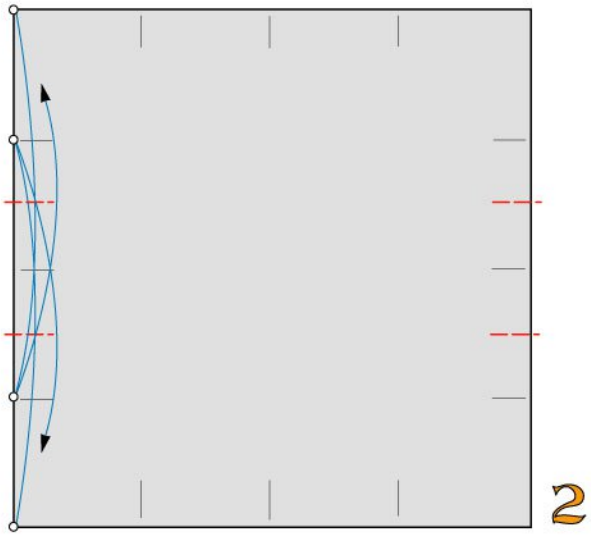
ESEMPIO DI PARETE DI CONDOMINIO A 4 PIANI

TIMPANO destro

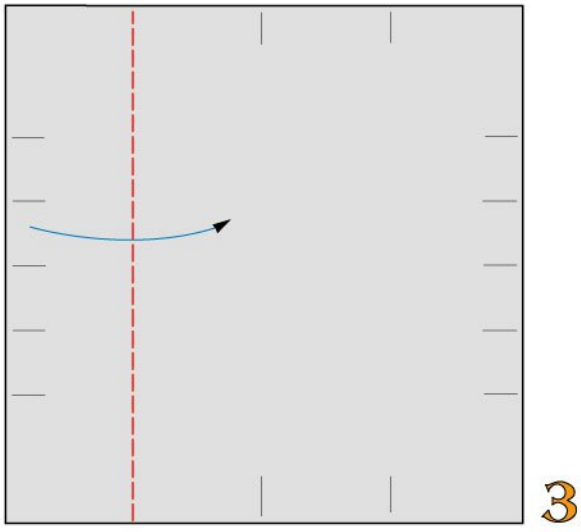
Il timpano è quella parte di parete di forma triangolare sottostante al tetto



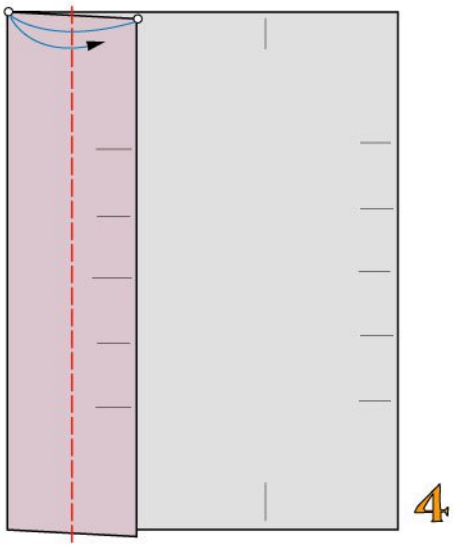
12 piccole pieghe a valle



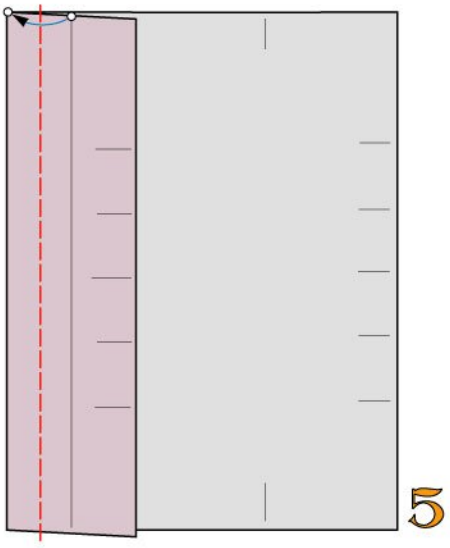
4 piccole pieghe a valle



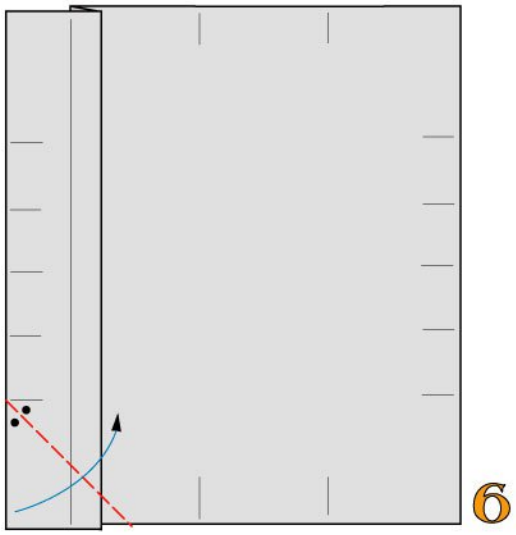
1 piega a valle e ruotate



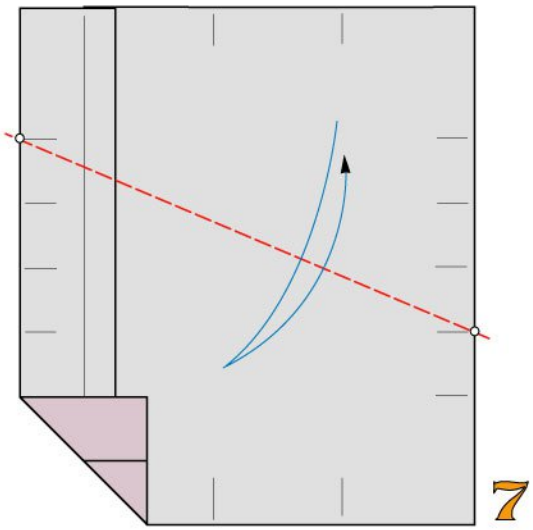
1 piega a valle solo sulla sup.
in vista e ruotate



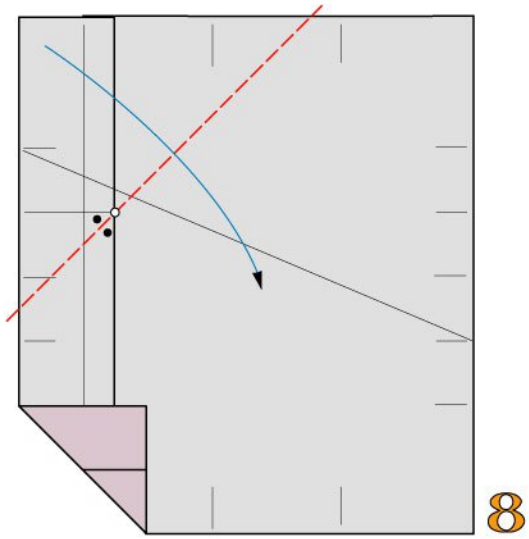
1 piega a valle e ruotate



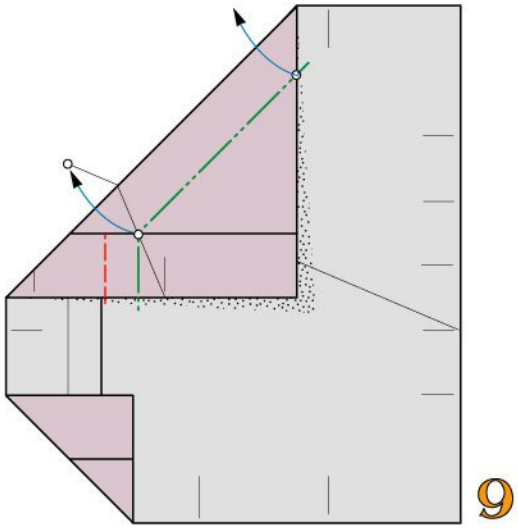
1 piega bisettrice a valle e ruotate



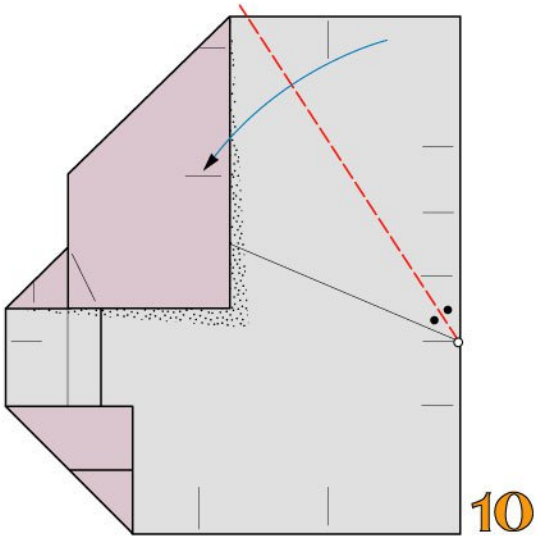
1 piega a valle



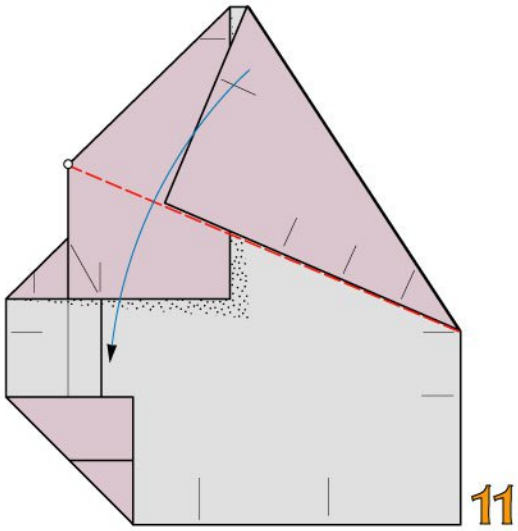
1 piega bisettrice a valle e ruotate



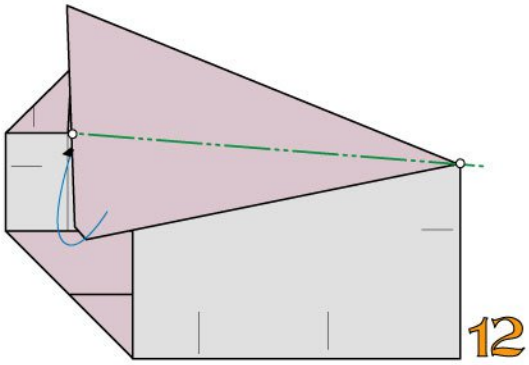
Strana piega rovescia che si ottiene con 2 pieghe a monte ed 1 a valle



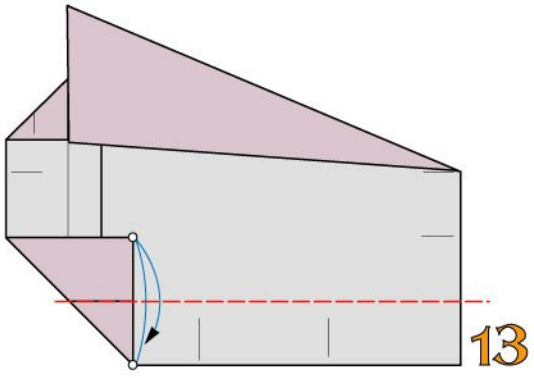
1 piega bisettrice a valle e ruotate



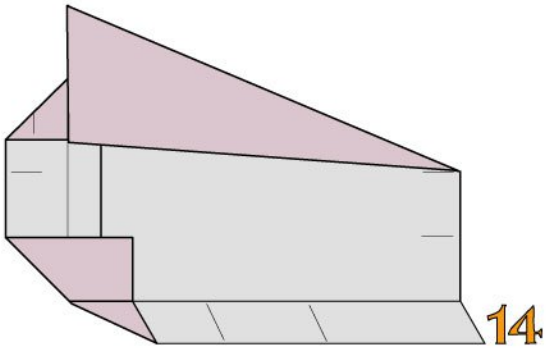
1 piega bisettrice a valle e ruotate



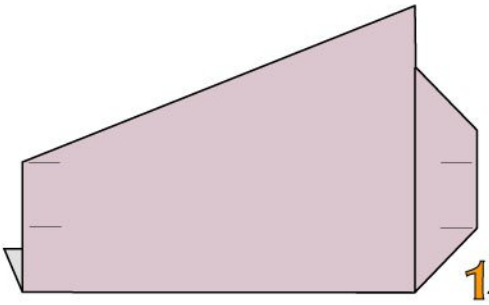
1 piega a monte e ruotate intascando

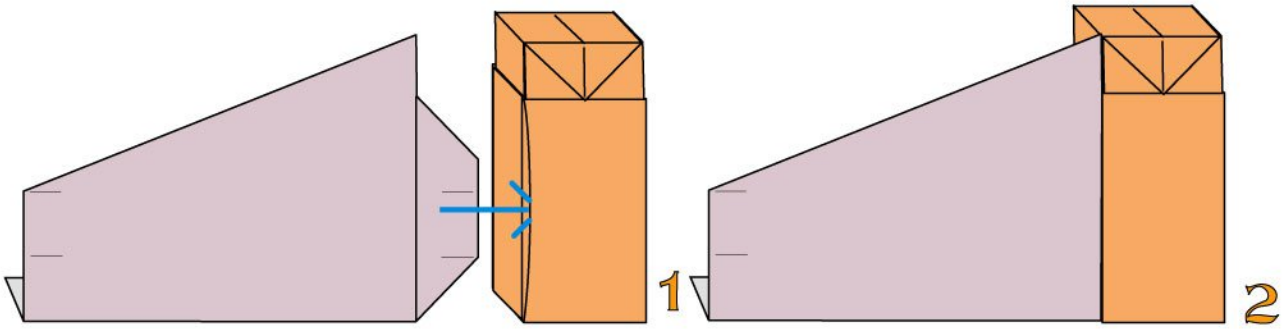


1 piega a valle e ruotate 3D



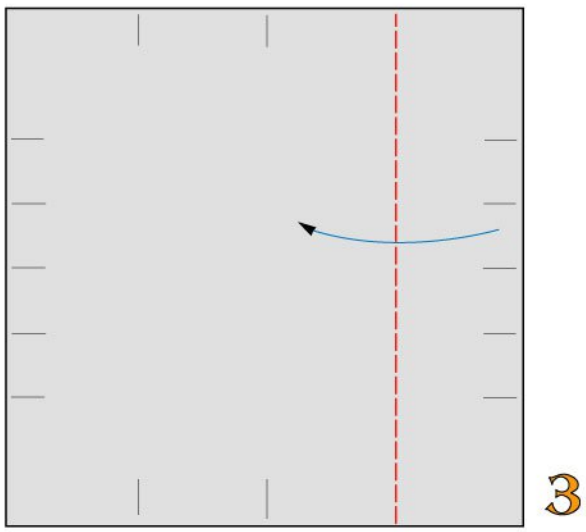
Timpano ultimato, vista interna.
Ribaltate



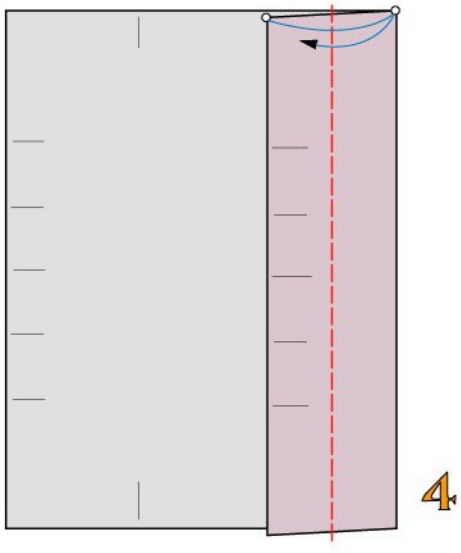


Il bordo inferiore del timpano si iserisce nella trave e quello verticale nel pilastro

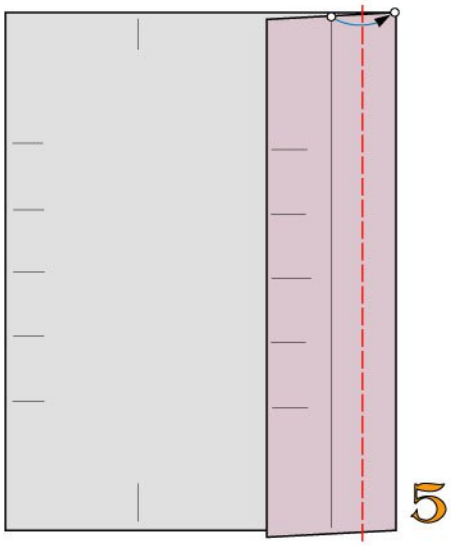
TIMPANO sinistro



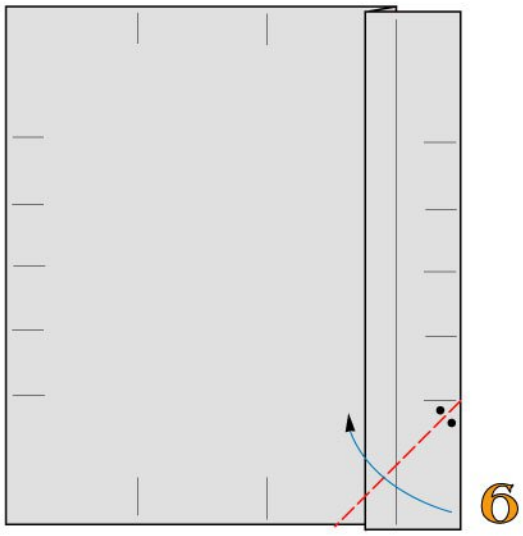
Partite dalla fig. n. 2 del timpano destro.
1 piega a valle e ruotate



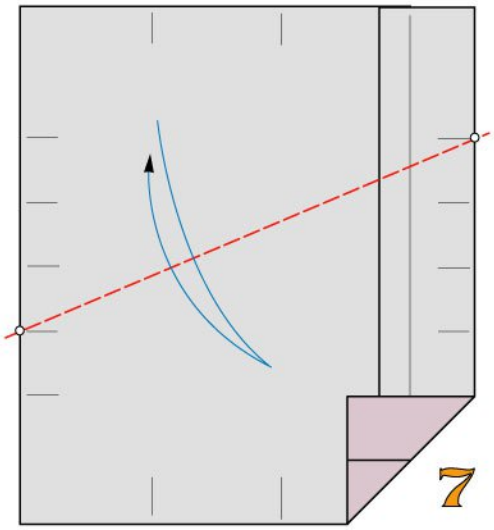
1 piega a valle solo sulla sup.
in vista e ruotate



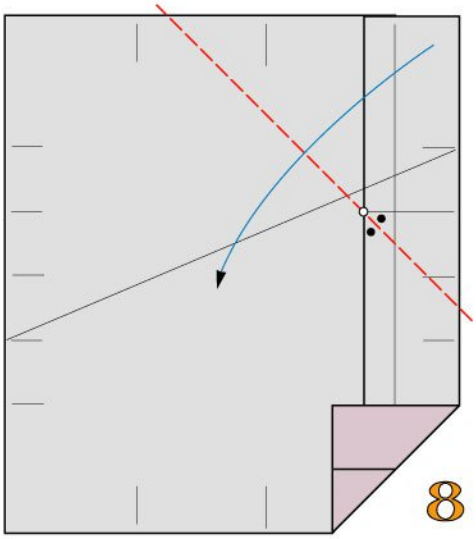
1 piega a valle e ruotate



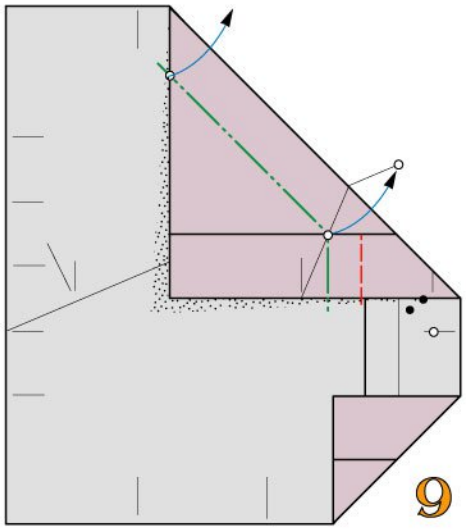
1 piega bisettrice a valle e ruotate



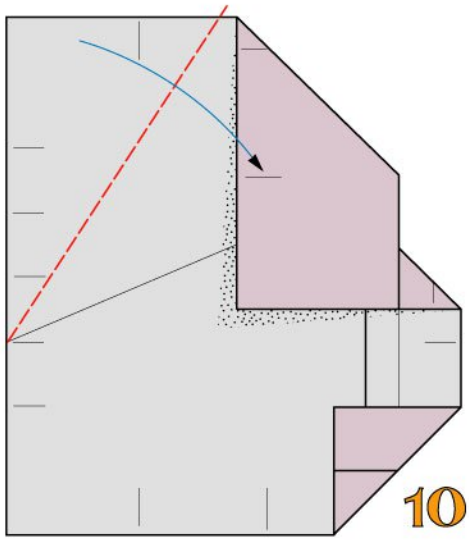
1 piega a valle



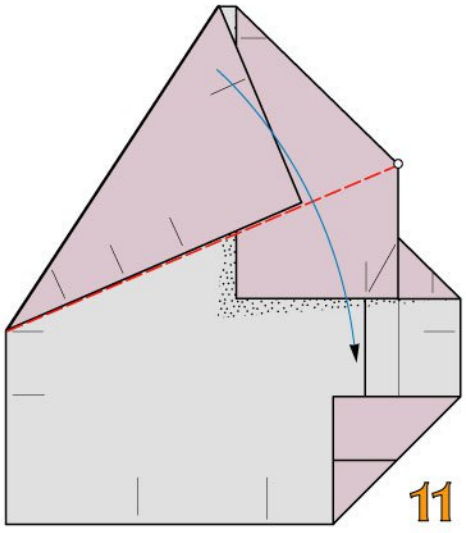
1 piega bisettrice a valle e ruotate



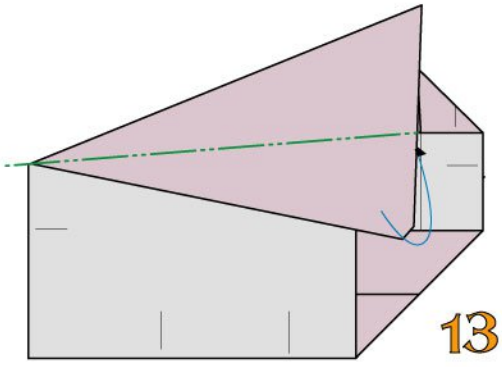
1 piega a valle, 2 a monte e ruotate



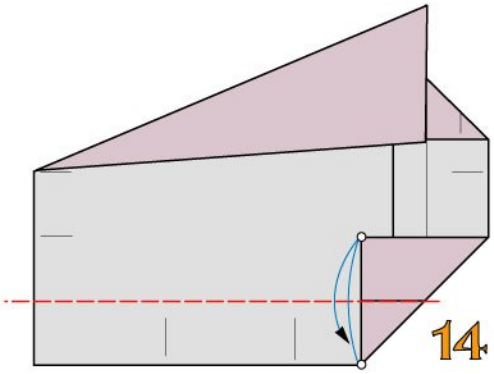
1 piega bisettrice a valle e ruotate



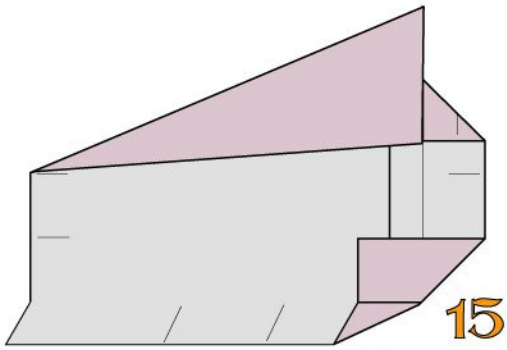
1 piega a valle e ruotate



1 piega a monte e intascate bloccando



1 piega a valle

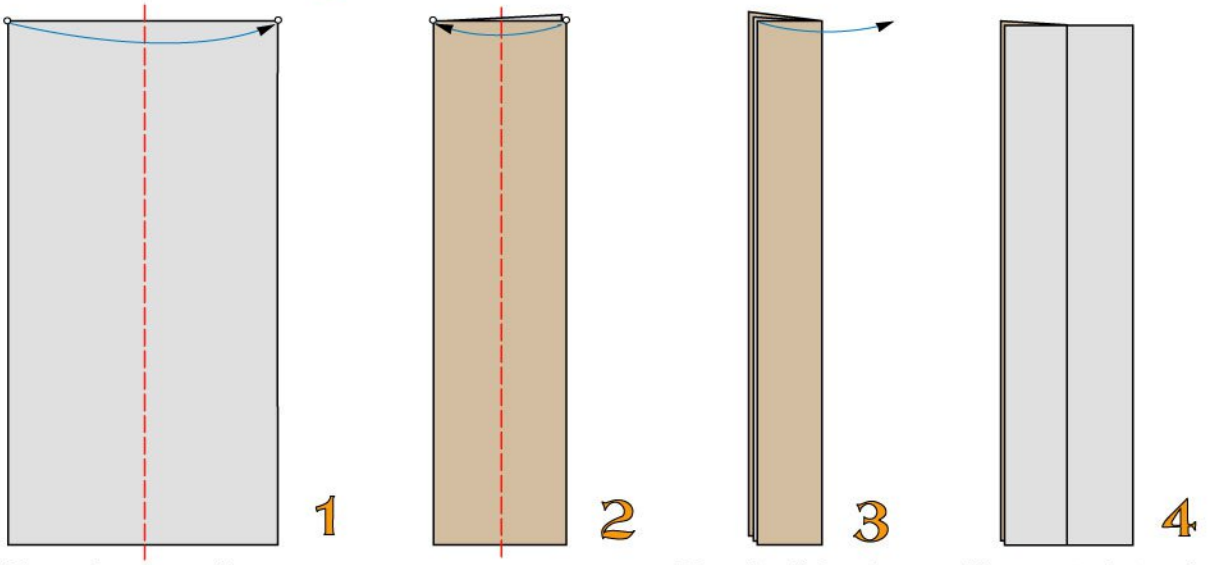


Timpano destro ultimato

COPERTURA

La realizzazione di una copertura origami presuppone il superamento del problema tecnico di giunzione dei singoli elementi. In questo caso ho studiato una copertura globale monofalda, di 2 larghezze differenti, demandando ad un successivo studio la tecnica di realizzazione di tetti complessi con compluvi e displuvi.
Il modulo base è formato da 3 elementi: 2 laterali, che si realizzano con mezzi fogli ed 1 centrale costituito dal foglio quadrato non piegato.

Modulo 8/8



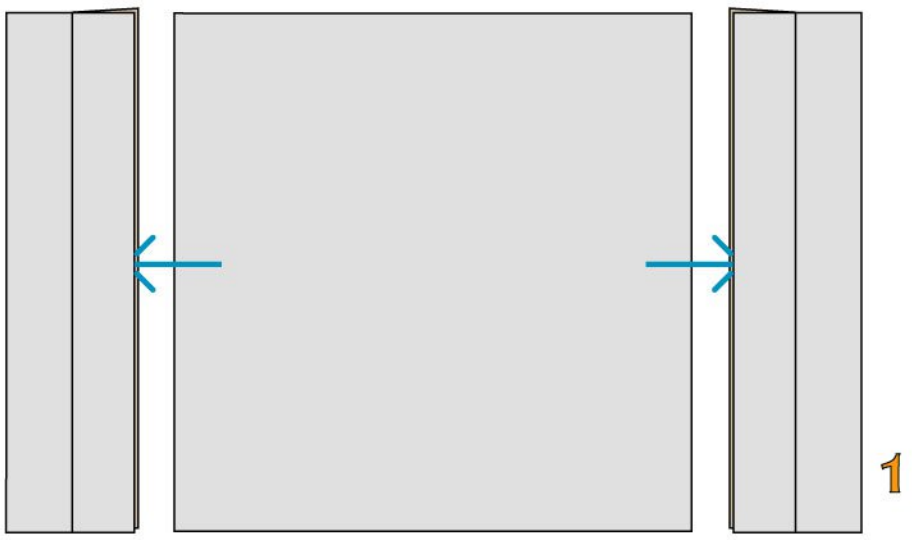
Una piega a valle e ruotate

Una piega a valle e ruotate

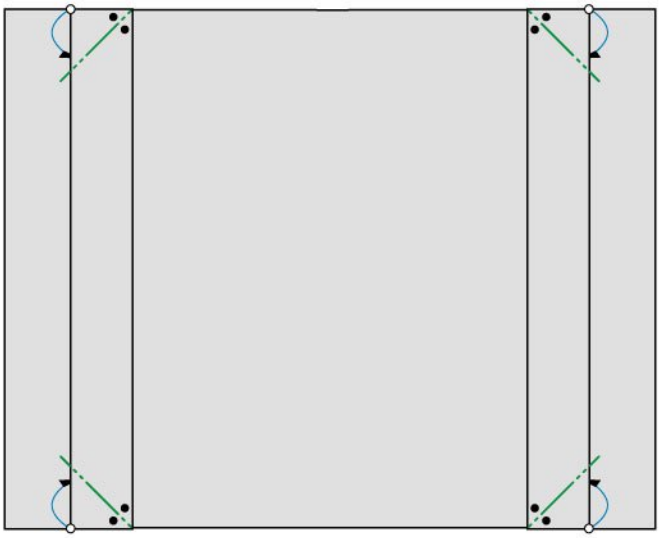
Riaprite il bordo superiore

Elemento laterale ultimato

UNIONE DEI 3 ELEMENTI

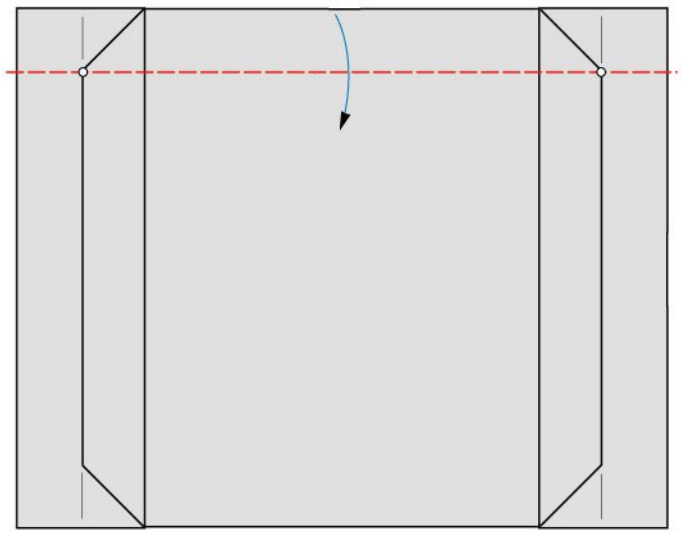


Inserite i bordi verticali del foglio centrale nelle tasche degli elementi laterali



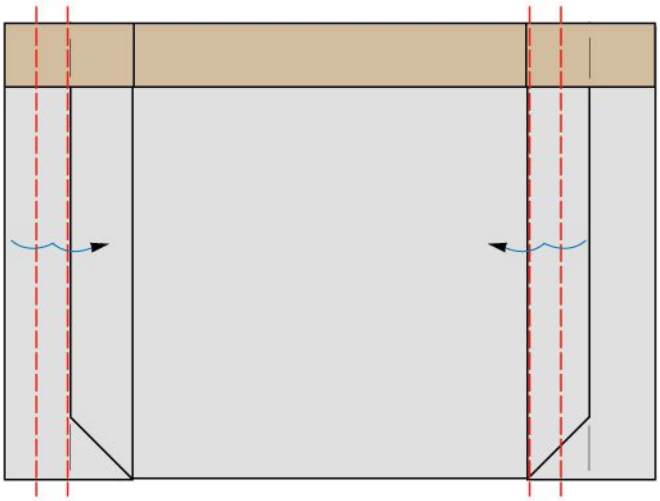
4 pieghe bisettrici a monte e ruotate per bloccare l'unione

2



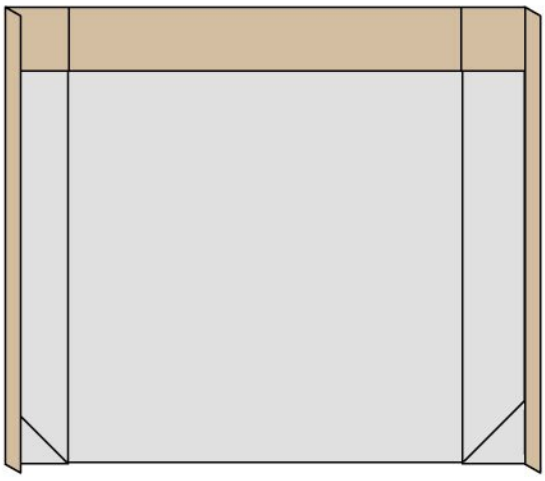
1 piega a valle e ruotate.
Questa piega è necessaria per irrigidire trasversalmente il modulo

3



4

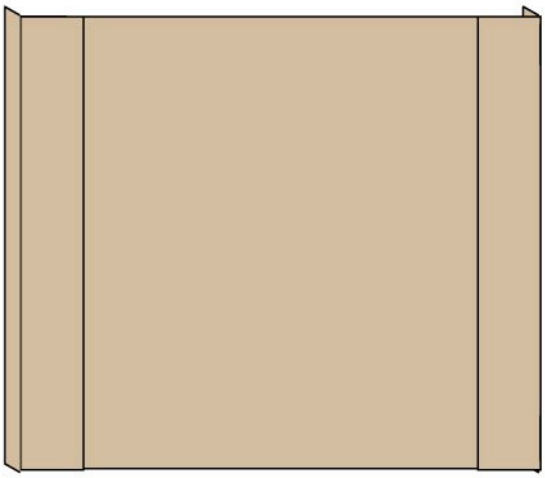
4 pieghe a valle e ruotate 3D i bordi verticali



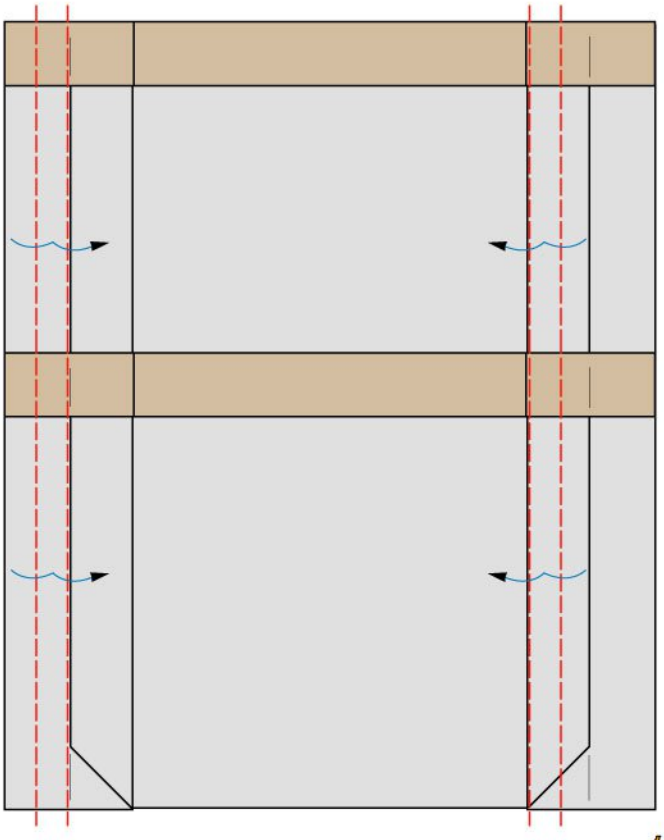
5

MODULO LARGO 8/8 ULTIMATO

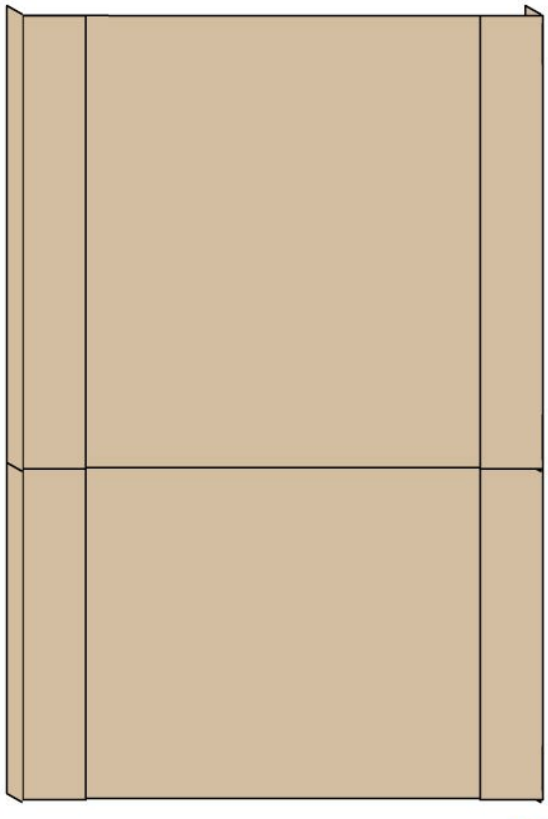




6



1



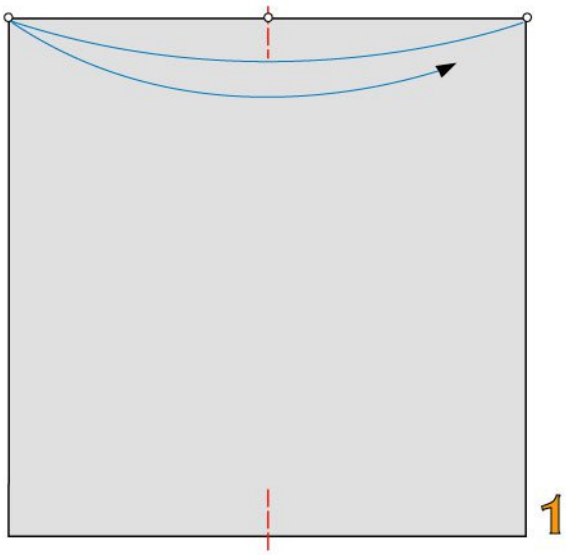
2

Per unire 2 moduli, sovrapponeteli prima dell'ultimo passaggio. Ribaltate

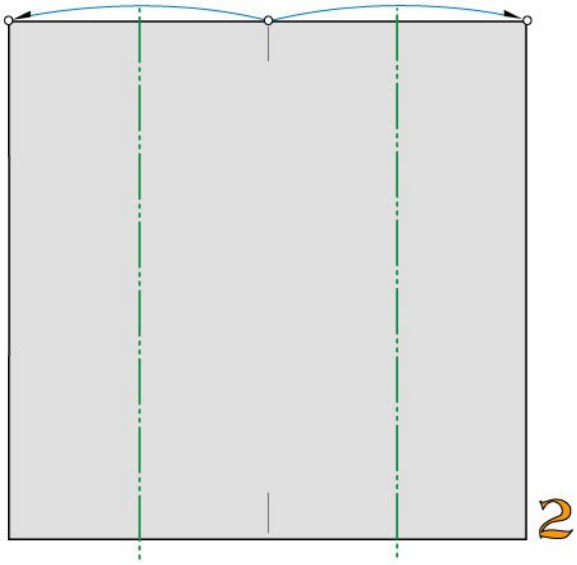
UNIONE DI 2 MODULI ULTIMATA

Modulo 10/8

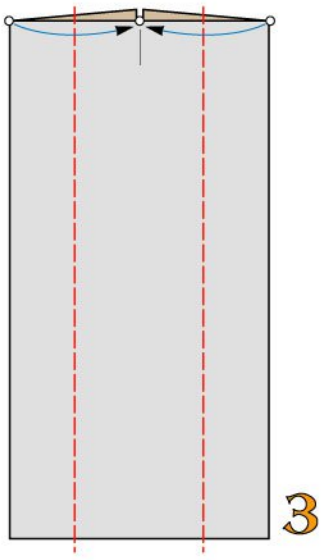
Il modulo base è formato da 3 elementi, realizzati con fogli quadrati:
2 laterali ed 1 centrale



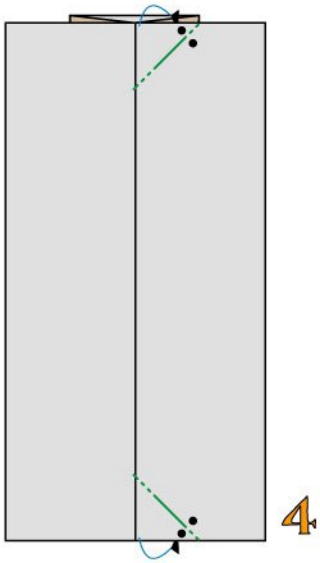
Il modulo laterale: 2 pieghe a valle



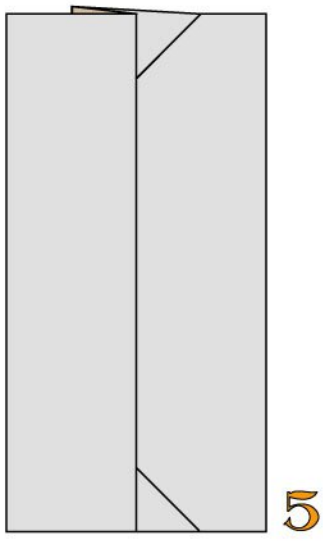
2 pieghe a monte e ruotate



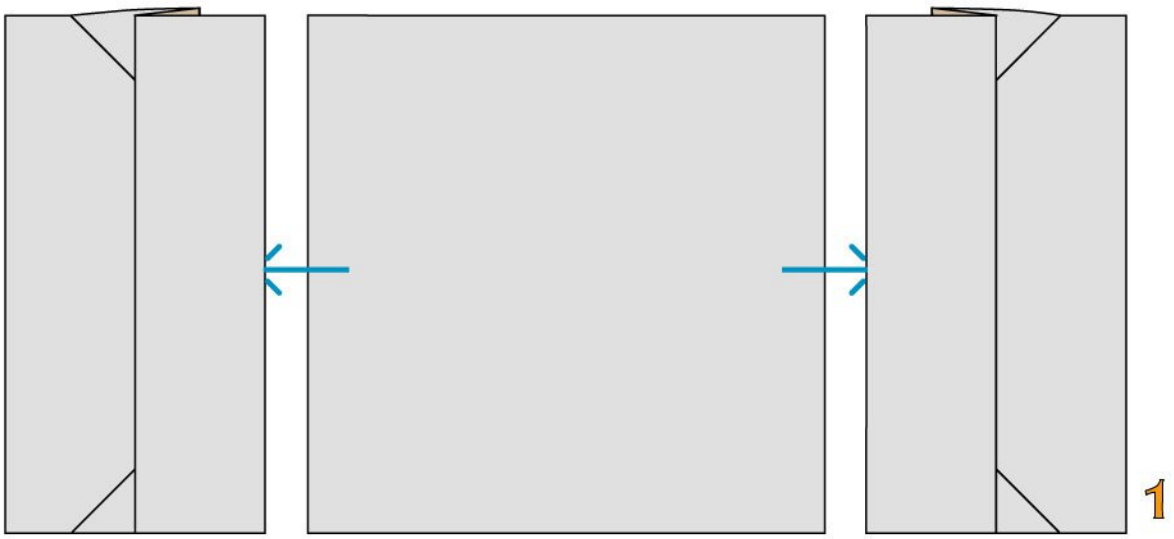
2 pieghe a valle solo sulla sup. in vista e ruotate



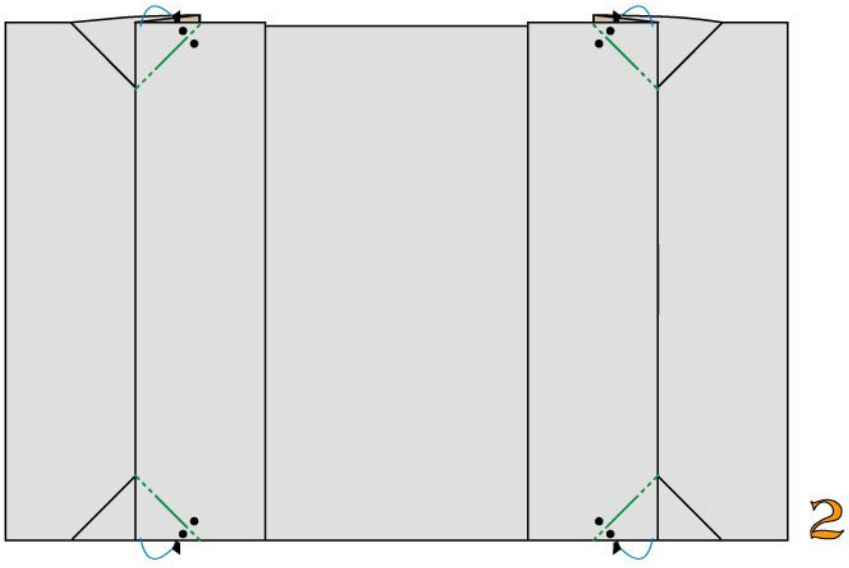
2 pieghe bisettrici a monte e ruotate



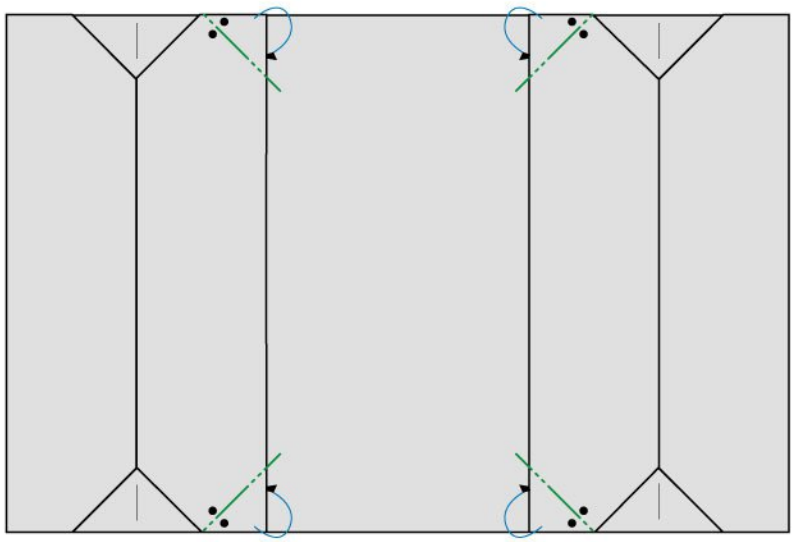
Elemento laterale ultimato



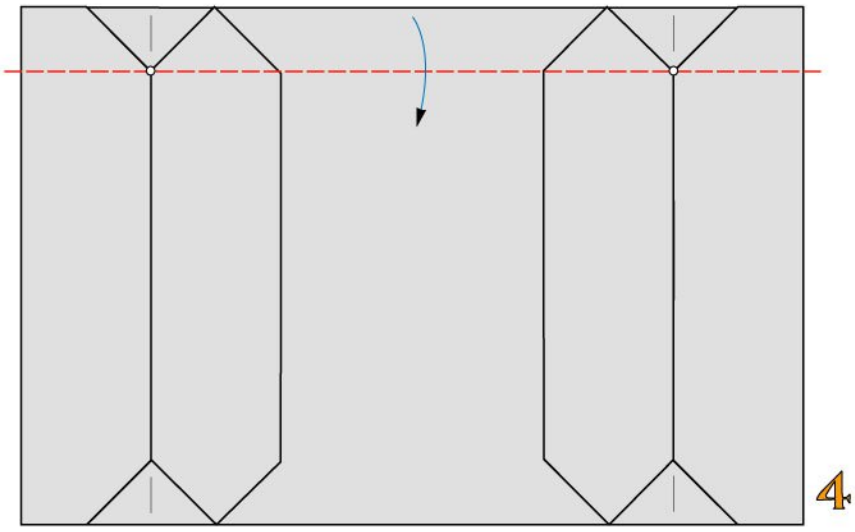
Inserite i bordi verticali del foglio centrale nelle tasche degli elementi laterali



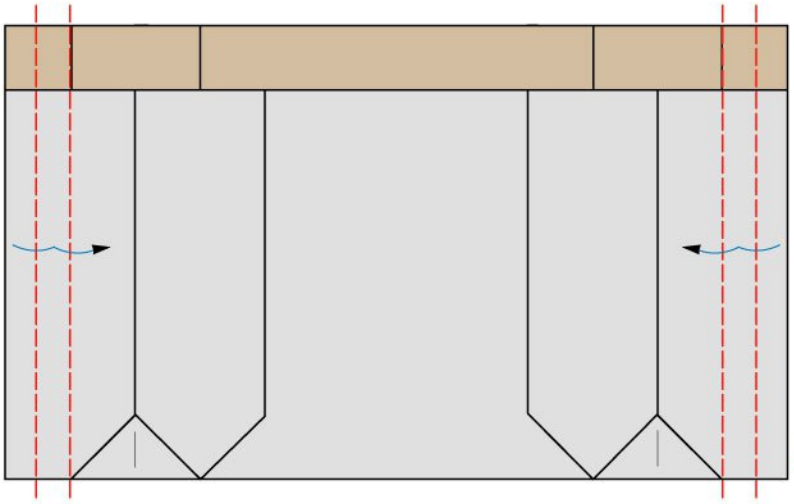
4 pieghe bisettrici a monte e ruotate per bloccare l'unione



4 pieghe bisettrici a monte e ruotate

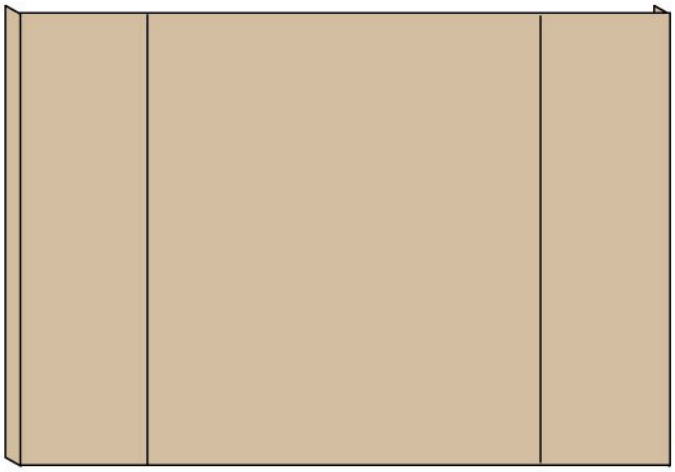


1 piega a valle e ruotate.
Questa piega è necessaria per irrigidire trasversalmente il modulo



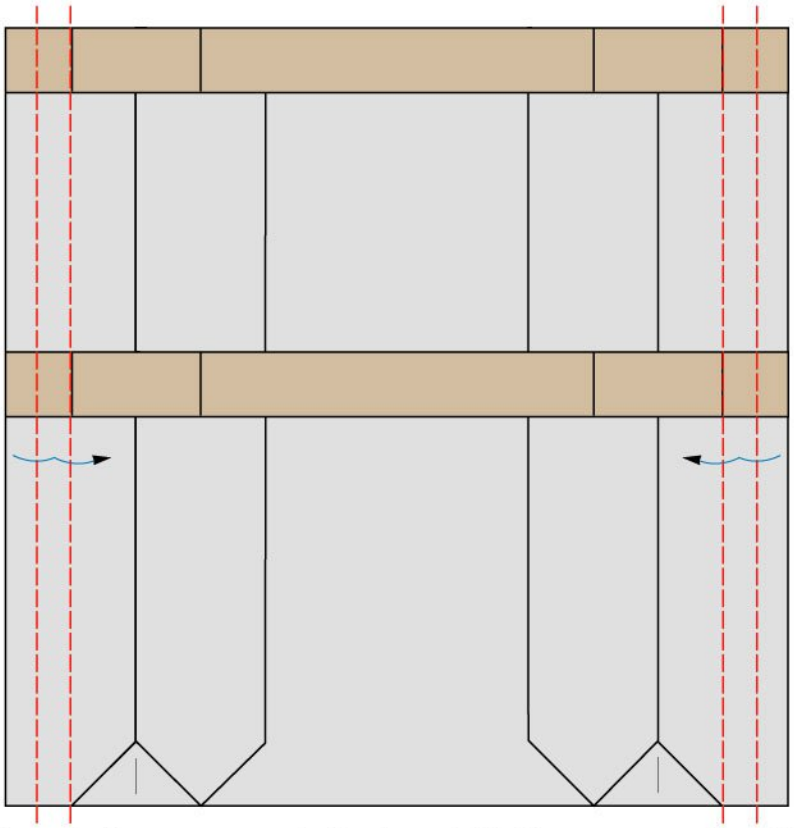
5

4 pieghe a valle e ruotate 3D i bordi verticali

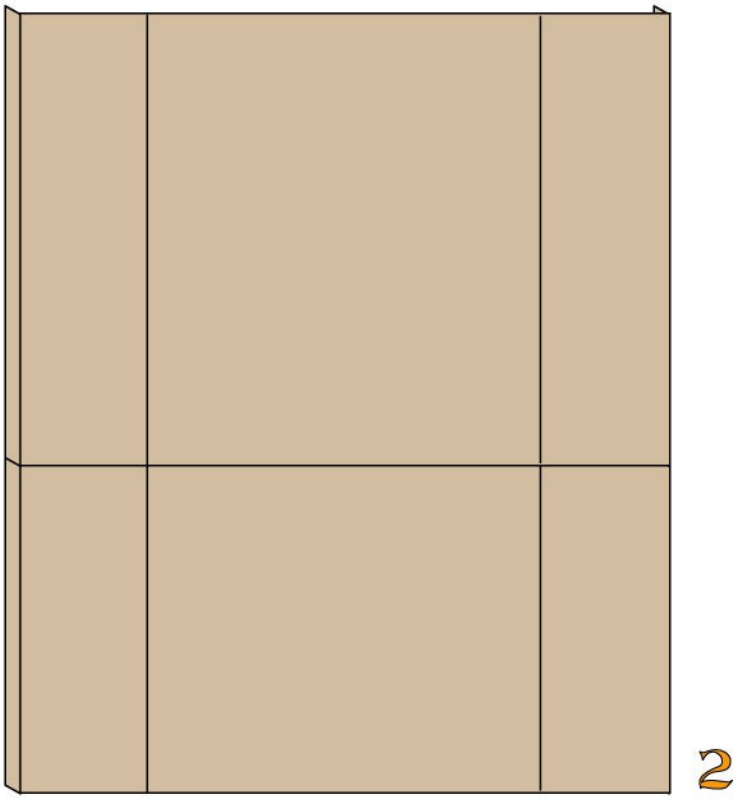


6

MODULO LARGO 10/8 ULTIMATO



Per unire 2 moduli, sovrapponeteli prima dell'ultimo passaggio. Ribaltate

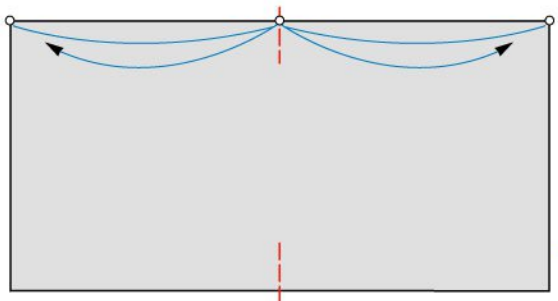


UNIONE DI 2 MODULI ULTIMATA

CAPPUCCIO INCLINATO

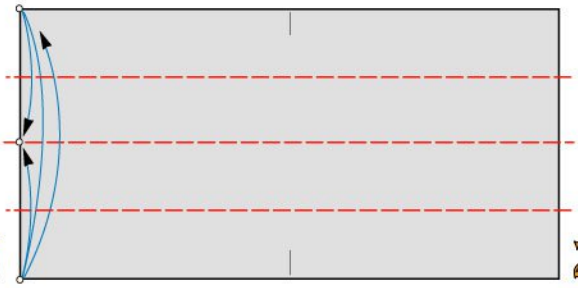
Elemento necessario per la chiusura di pilastri rettangolari in corrispondenza della copertura. Ce ne sono di due tipi: alto e basso.

CAPPUCCIO INCLINATO ALTO



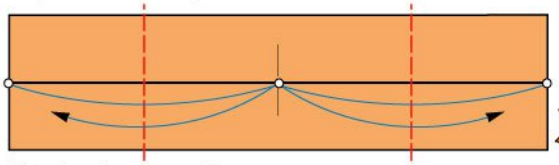
1

2 piccole pieghe a valle



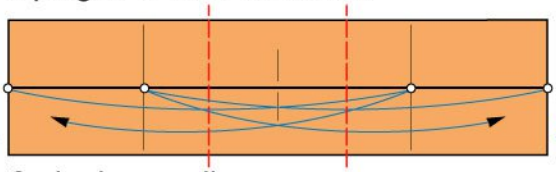
2

3 pieghe a valle e ruotate



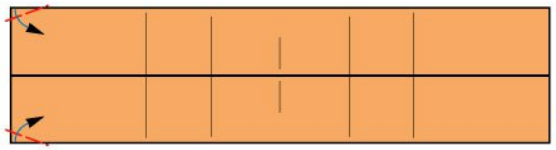
3

2 pieghe a valle



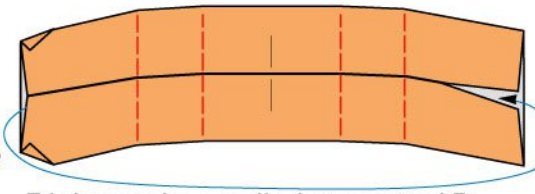
4

2 pieghe a valle



5

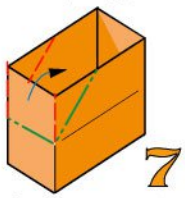
2 piccole pieghe a valle e ruotate



6

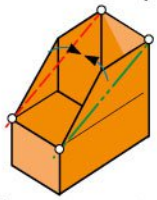
Ripiegando a valle intascate 3D





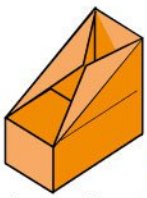
7

3 pieghe a monte e ruotate



8

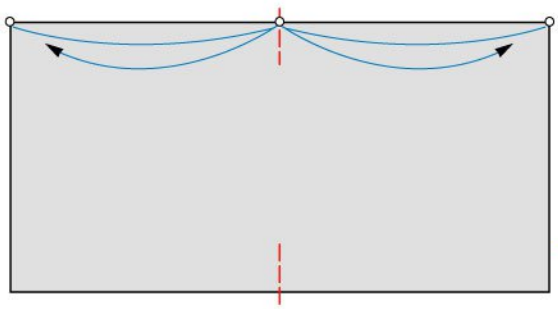
2 pieghe a monte e ruotate



9

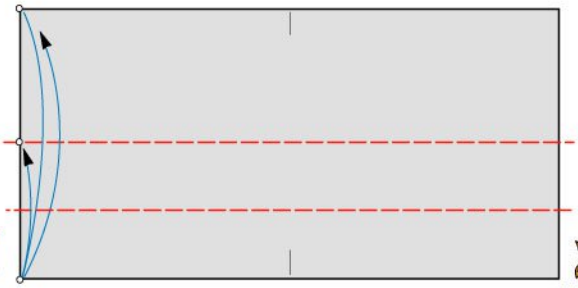
Cappuccio inclinato alto ultimato

CAPPUCCIO INCLINATO BASSO



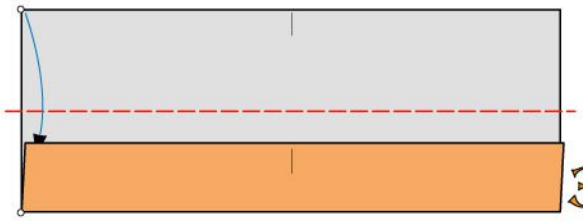
1

2 piccole pieghe a valle

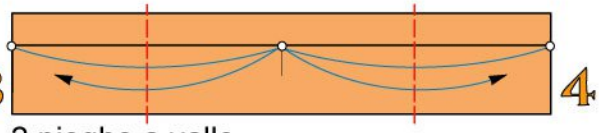


2

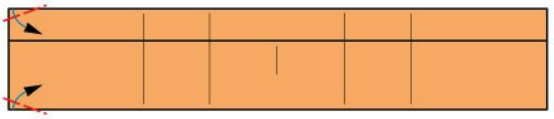
2 pieghe a valle e ruotate



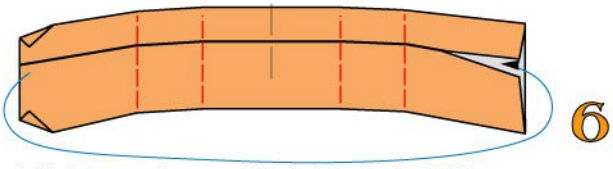
1 piega a valle e ruotate



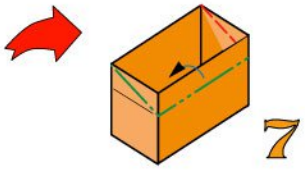
2 pieghe a valle



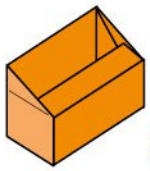
2 piccole pieghe a valle e ruotate



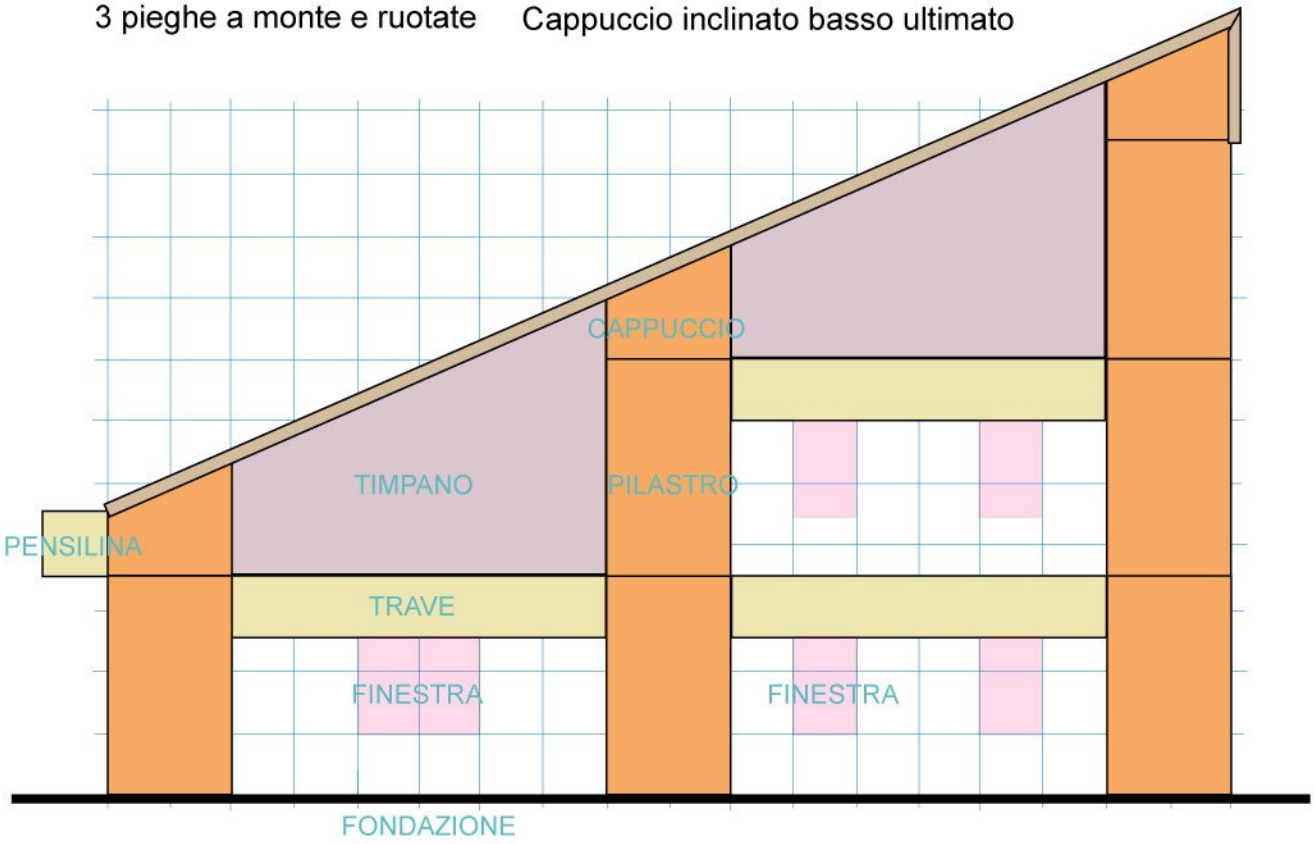
Ripiegando a valle intascate 3D



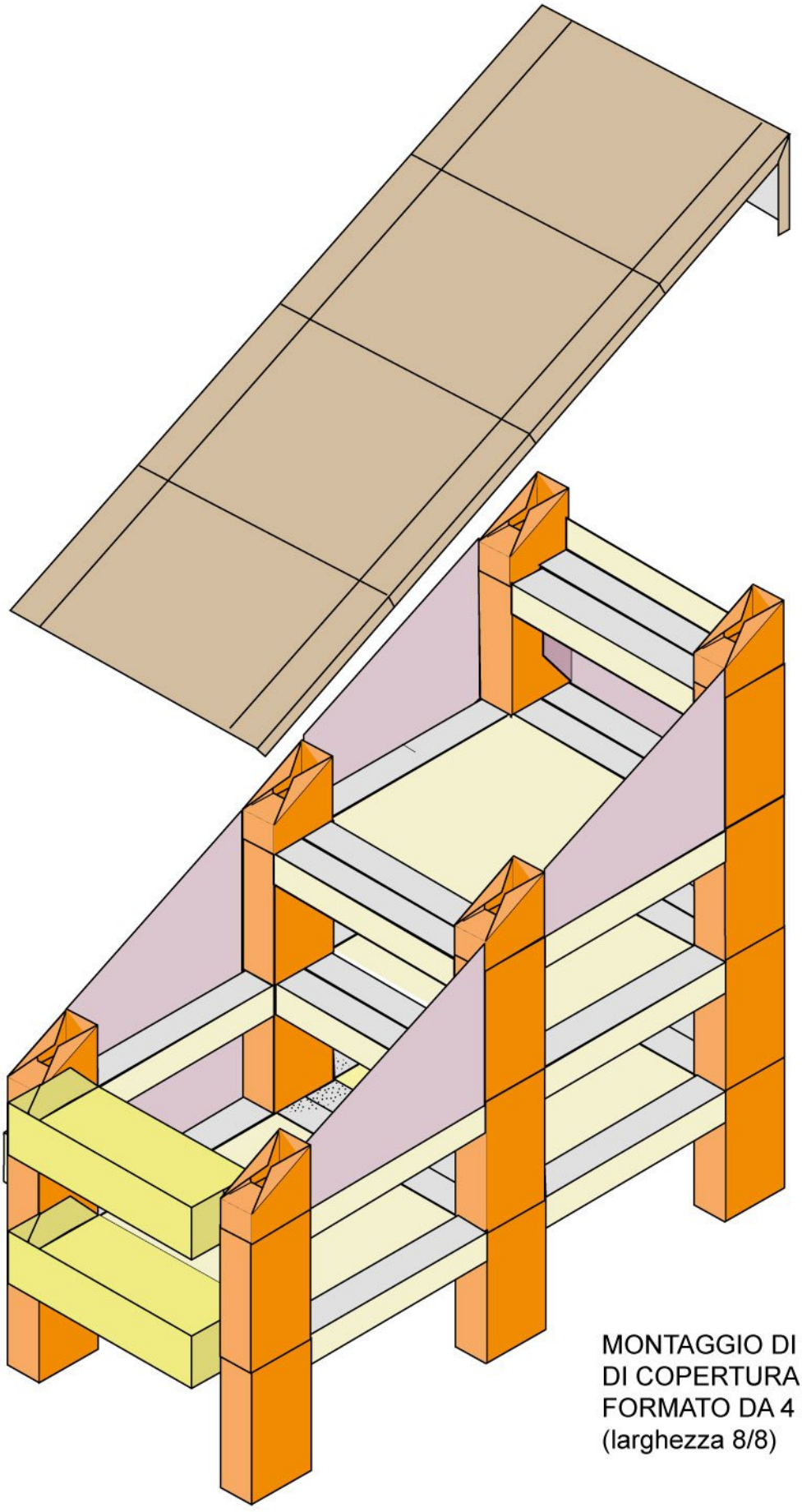
3 pieghe a monte e ruotate



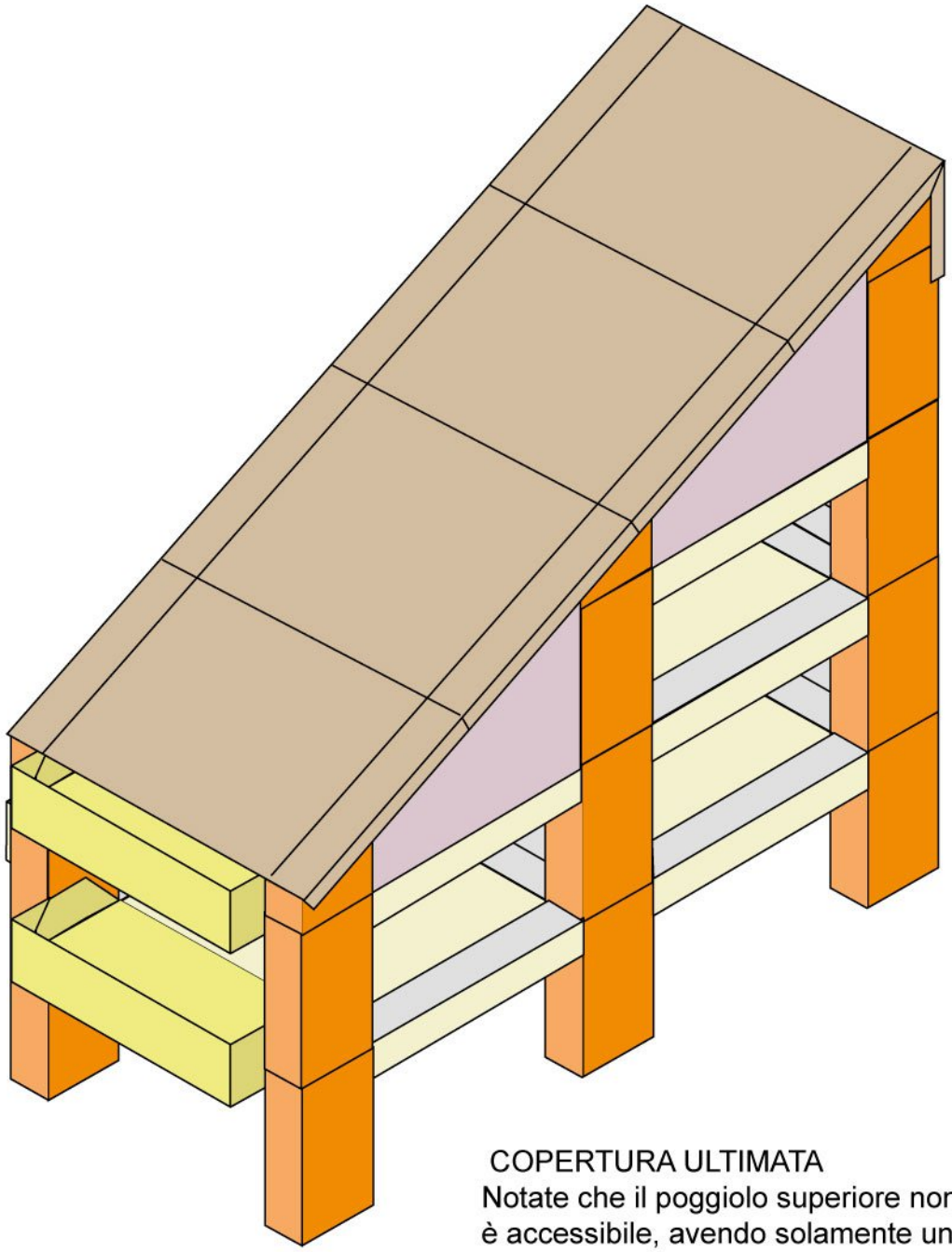
Cappuccio inclinato basso ultimato



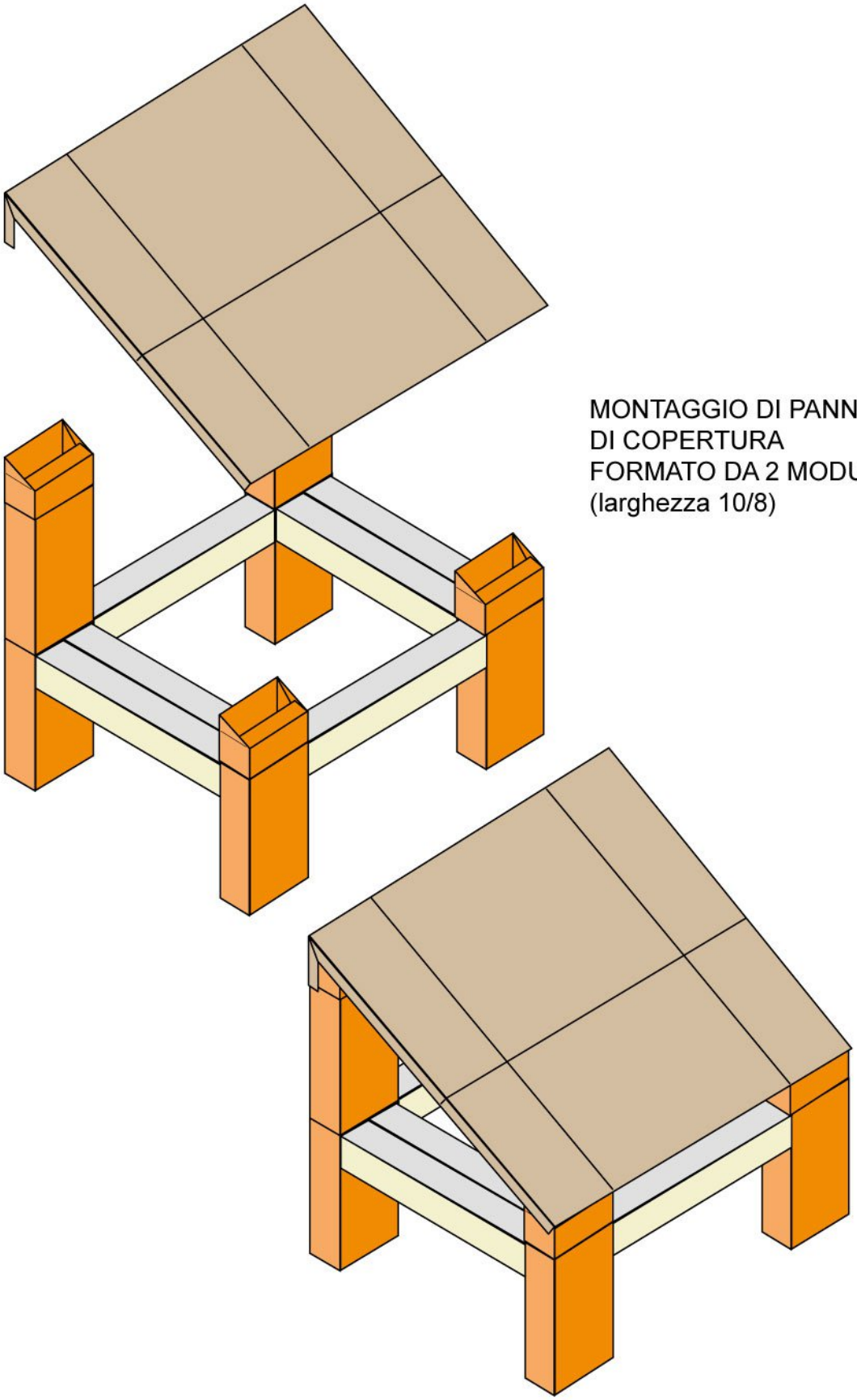
Schema di sezione su reticolo con quadrato base 1/8 del foglio. Larghezza copertura 8/8.
Parete con finestra larga singola e pareti con 2 finestre strette.



MONTAGGIO DI PANNELLO
DI COPERTURA
FORMATO DA 4 MODULI
(larghezza 8/8)



COPERTURA ULTIMATA
Notate che il poggiolo superiore non è accessibile, avendo solamente una funzione estetica e di protezione (pensilina)



MONTAGGIO DI PANNELLO
DI COPERTURA
FORMATO DA 2 MODULI
(larghezza 10/8)

VANO SCALA

Il collegamento verticale è la parte principale dell'edificio, la sua colonna vertebrale. Le rampe di scala possono essere incastrate a mensola in pareti laterali portanti o armate a trave poggianti sui pianerottoli. Noi studieremo quest'ultima soluzione. Gli elementi-base necessari sono 2 rampe di scale differenti, 2 pianerottoli differenti, 8 semipilastri a sezione quadrata e 4 travi in c.a. Per le scale adoperate cartoncino.

RAMPA BASSA



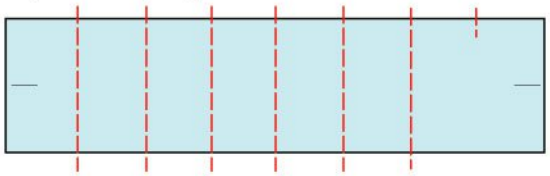
1

2 piccole pieghe a valle



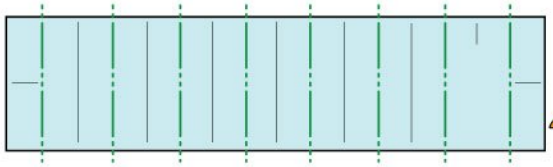
2

2 pieghe a valle, ruotate e ribaltate



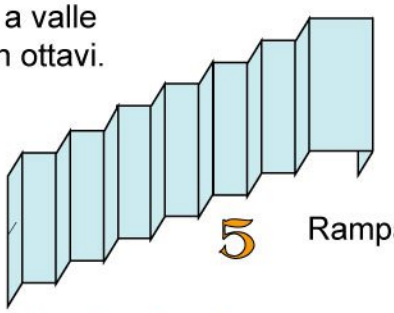
3

Mediante pieghe a valle dividete il foglio in ottavi.



4

Mediante pieghe a monte dividete il foglio in sedicesimi e ruotate 3D



5

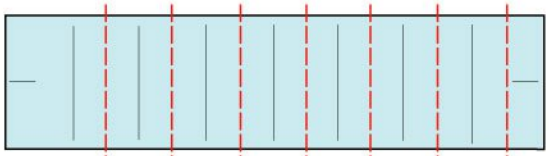
Rampa bassa ultimata

RAMPA ALTA



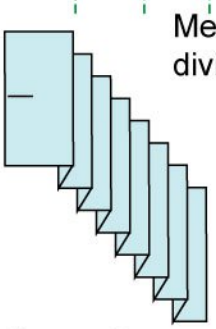
3

Mediante pieghe a monte dividete il foglio in ottavi.



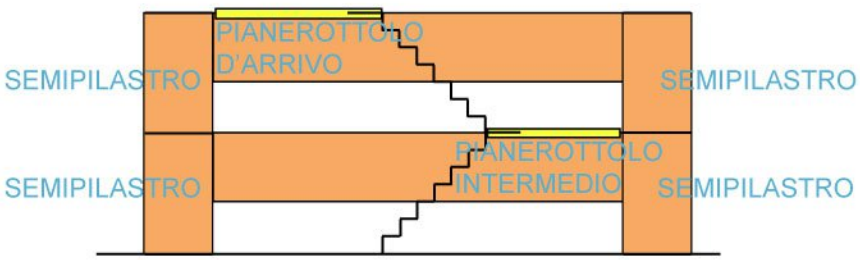
4

Mediante pieghe a valle dividete il foglio in sedicesimi



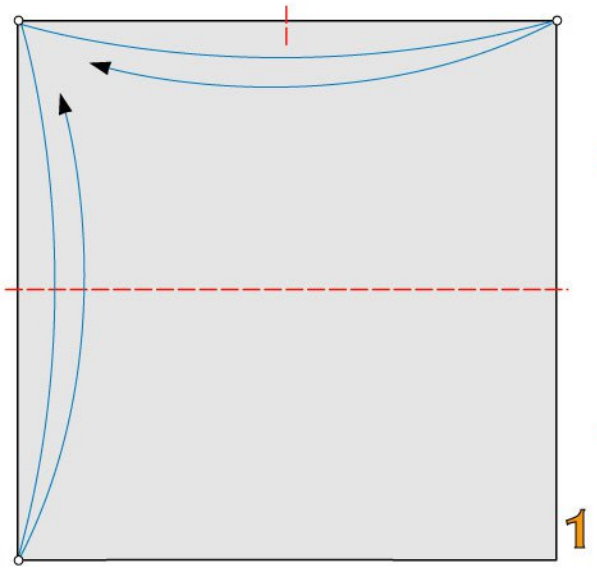
5

Rampa bassa ultimata

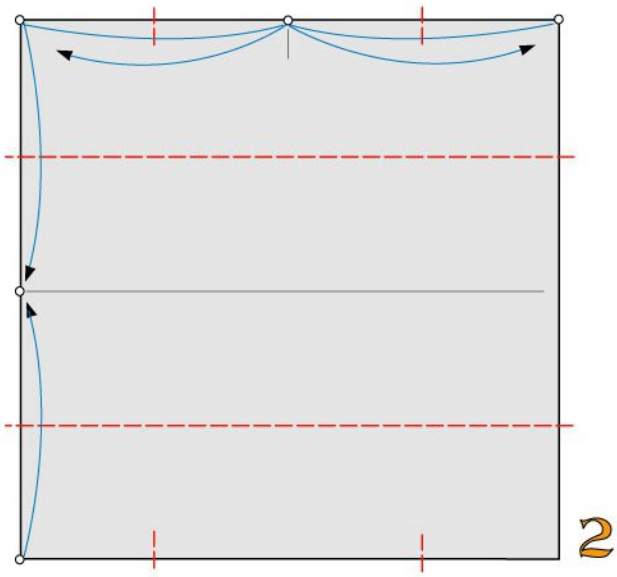


SEZIONE VERTICALE ILLUSTRANTE GLI ELEMENTI DEL VANO SCALE

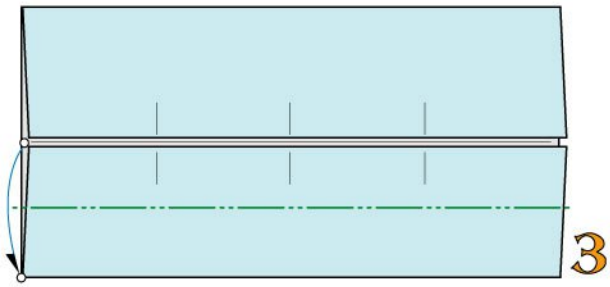
PIANEROTTOLO INTERMEDIO



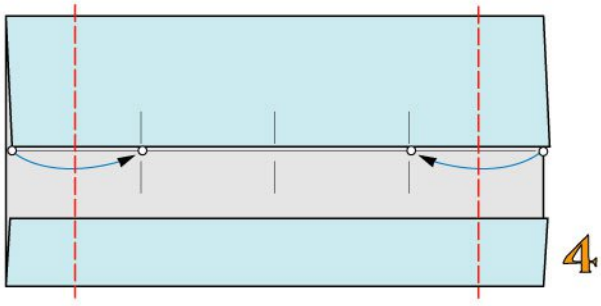
2 pieghe a valle,1 piccola ed 1 grande



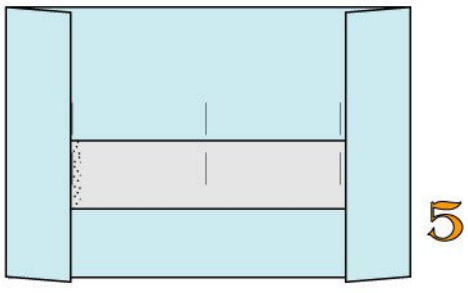
6 pieghe a valle, 4 piccole



1 piega a monte, solo sulla sup. in vista e ruotate

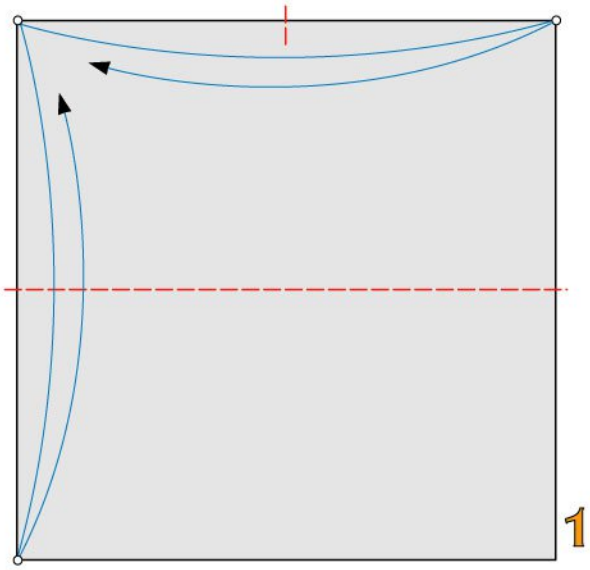


2 pieghe a valle e ruotate



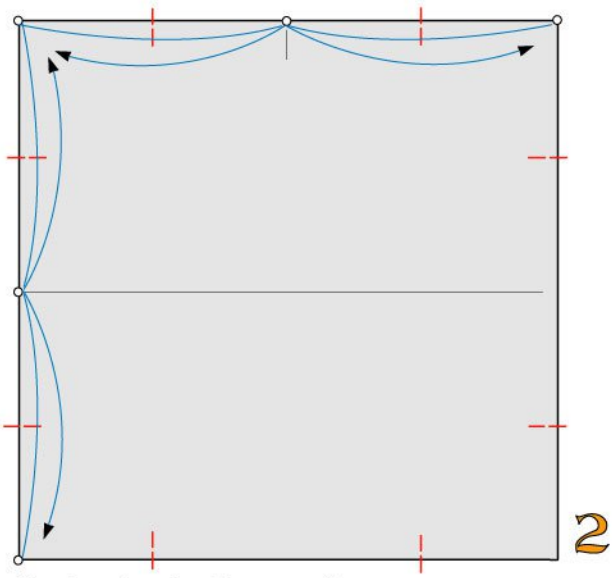
Pianerottolo intermedio ultimato

PIANEROTTOLO D' ARRIVO



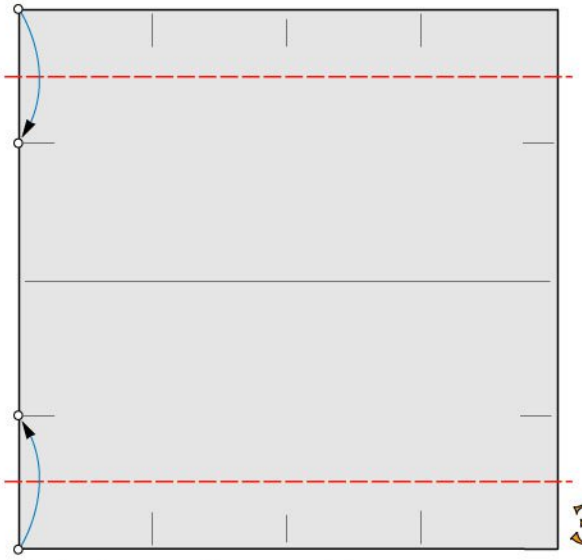
1

2 pieghe a valle, 1 piccola ed 1 grande



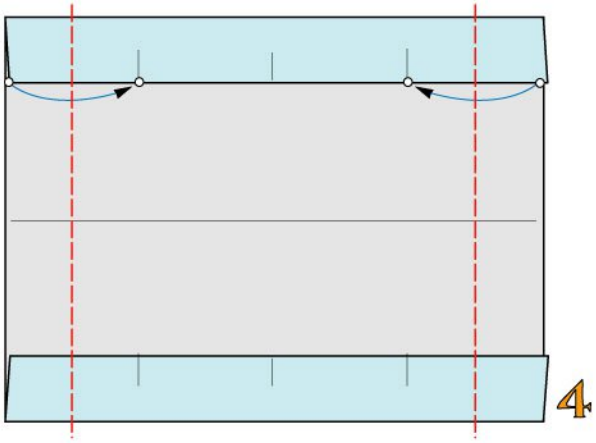
2

8 piccole pieghe a valle



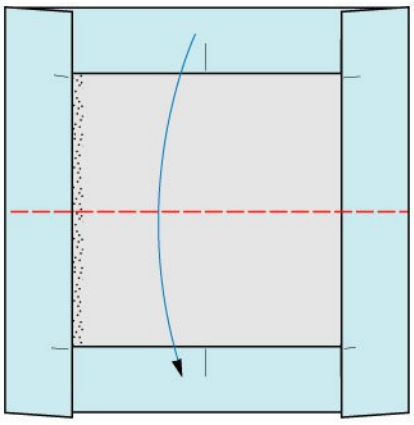
3

2 pieghe a valle e ruotate



4

2 pieghe a valle e ruotate



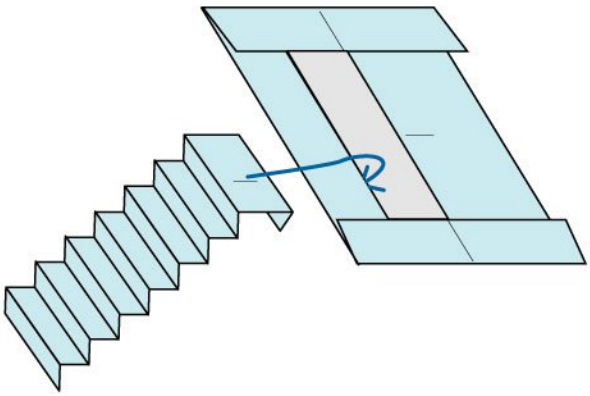
5

1 piega a valle e ruotate

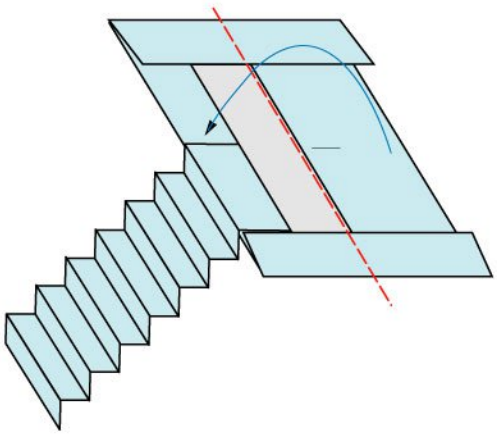


Pianerottolo d'arrivo ultimato

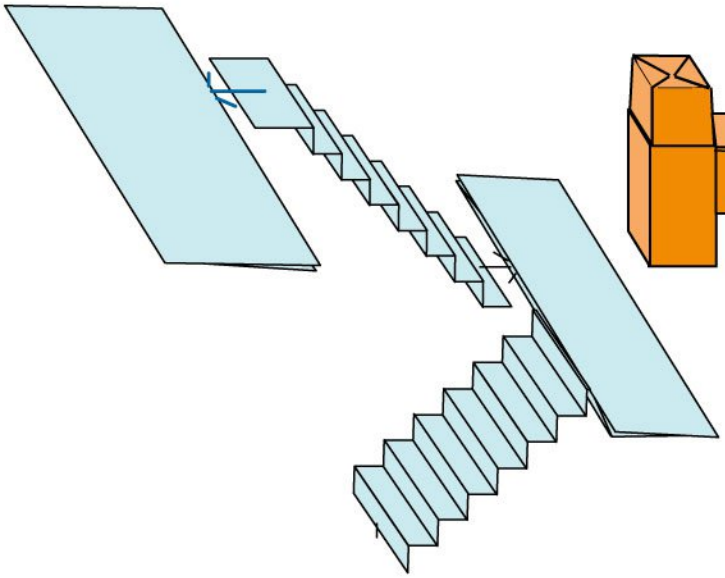
MONTAGGIO DEGLI ELEMENTI DEL VANO SCALA



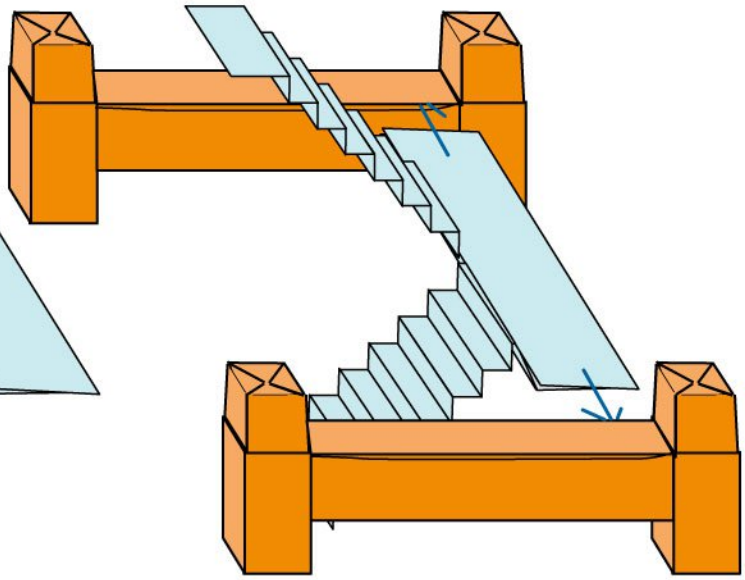
Collegate la rampa bassa
con il pianerottolo intermedio



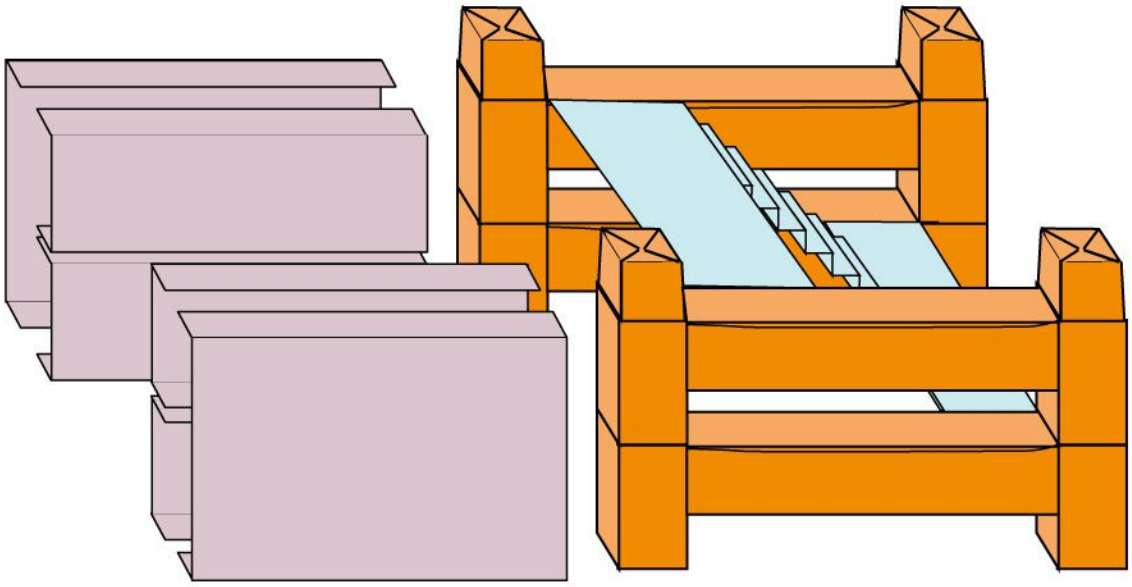
Mediante piega a valle chiudete
il pianerottolo intermedio



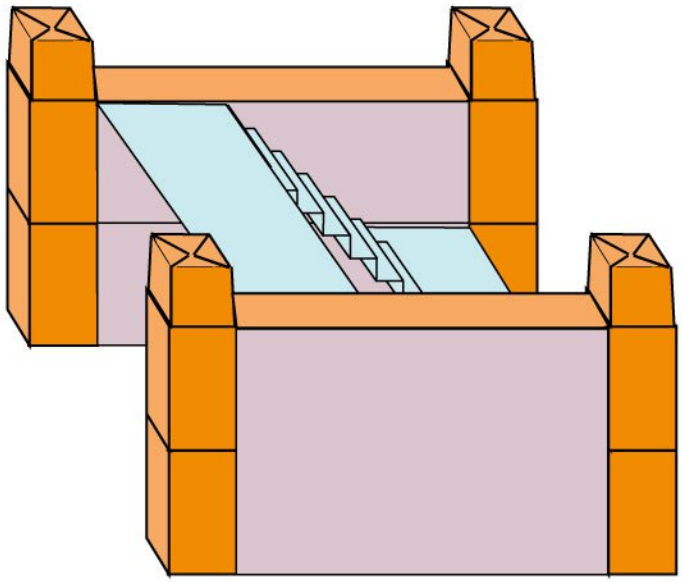
Inserite la rampa alta
nei 2 pianerottoli



Collegate 2 travi a 4 semipilastri a sezione quadrata.
Intascate il pianerottolo intermedio nelle travi.



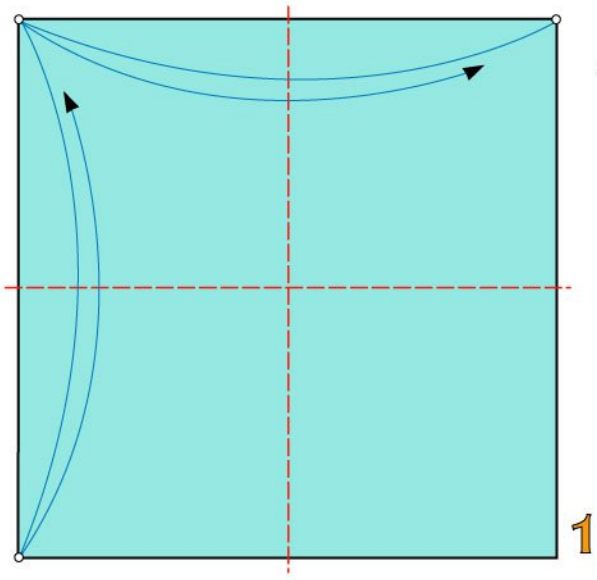
Aggiungete altri 4 semipilastri e 2 travi.Inscatolate le travi con 2 pareti e 4 semipareti.
Intascate il pianerottolo superiore nelle travi



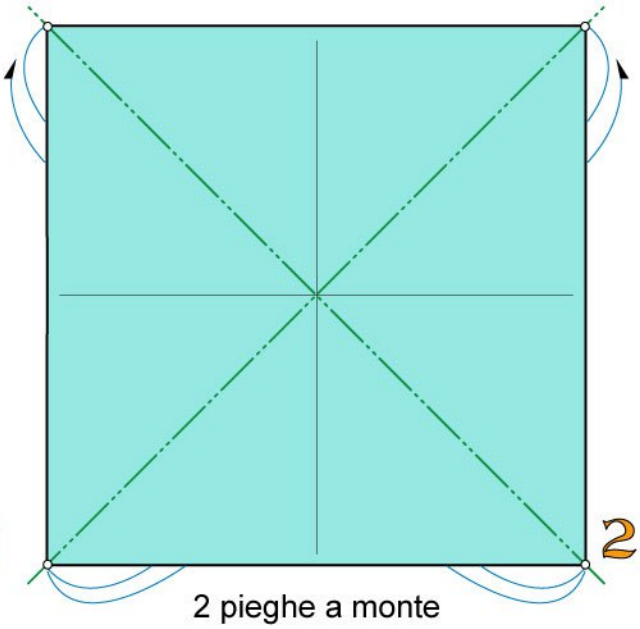
VANO SCALA ULTIMATO

CIPRESSO

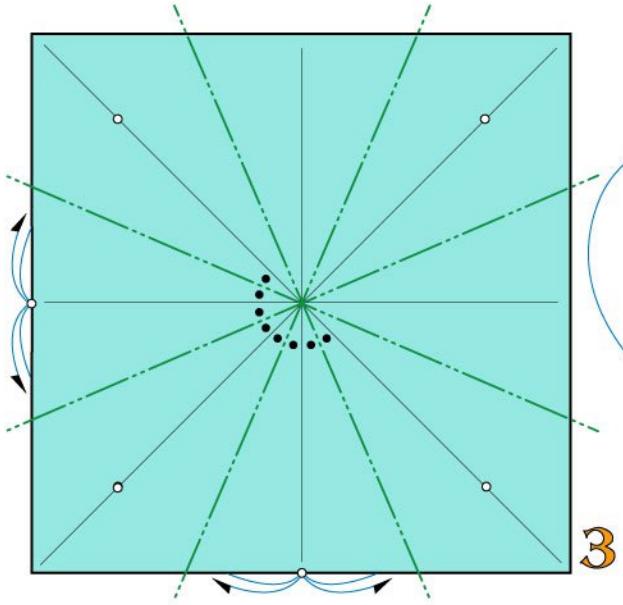
A volte nella realizzazione di un'ambientazione può essere utile il posizionamento di alberi. Qui si illustra la costruzione di un semplice modello di cipresso.



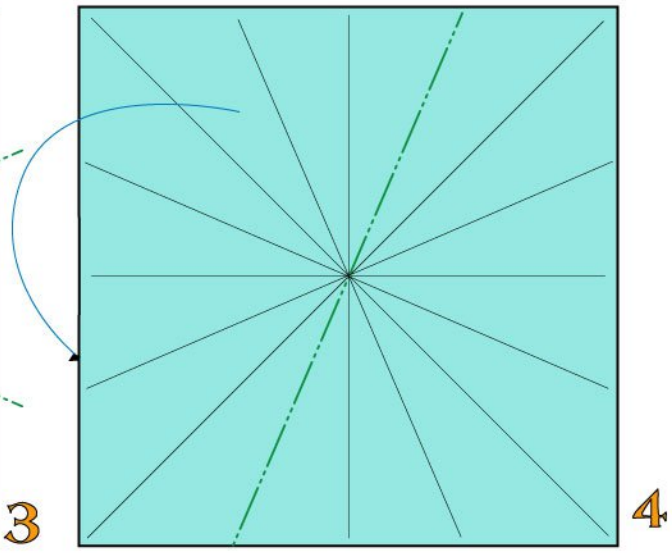
2 pieghe a valle



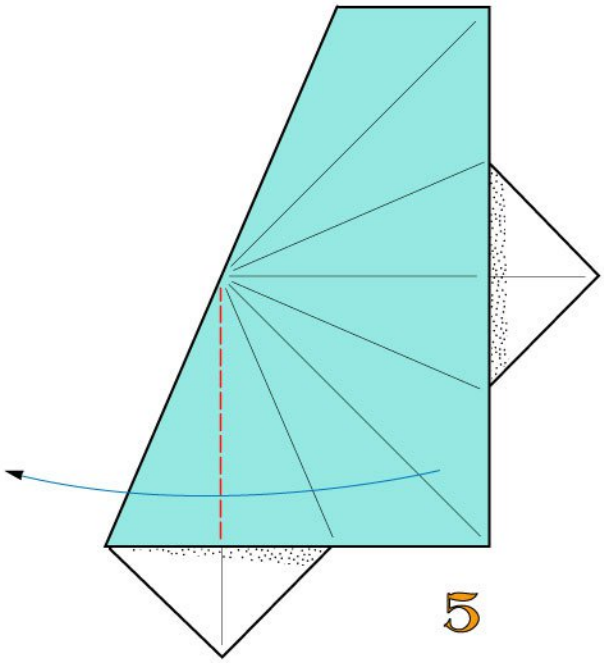
2 pieghe a monte



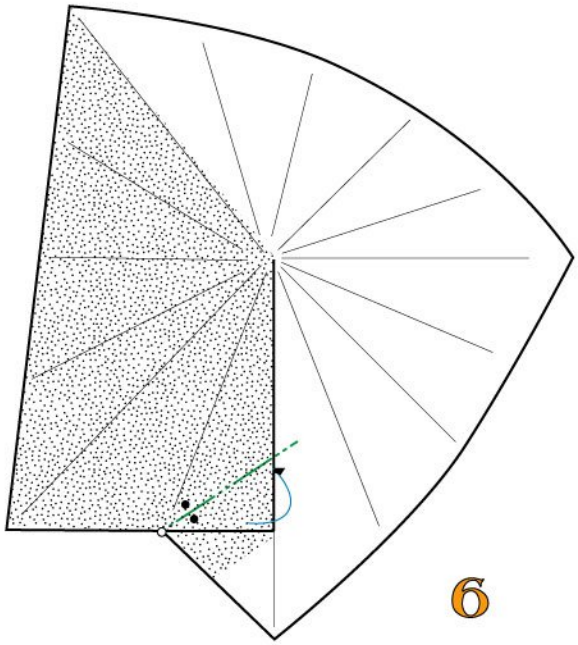
4 pieghe bisettrici a monte



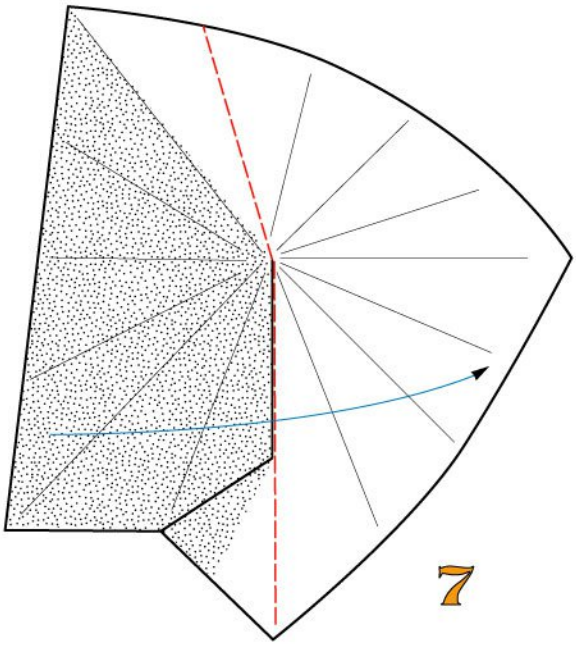
Ruotate ripiegando a monte



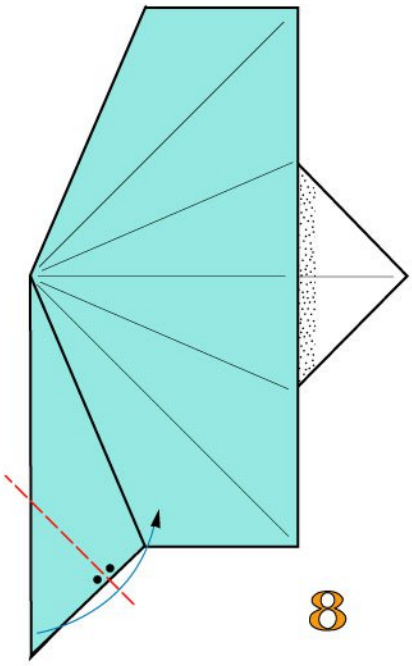
Ruotate 3D ripiegando a valle



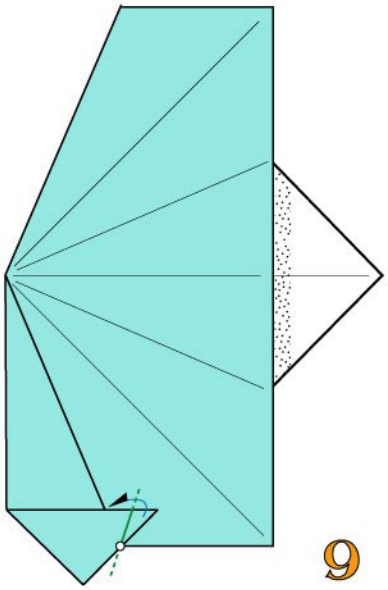
Una piega a monte e ruotate bloccando in posizione



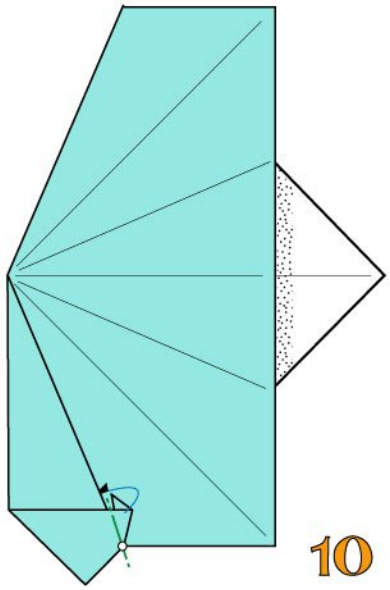
Ruotate 2D ripiegando a valle



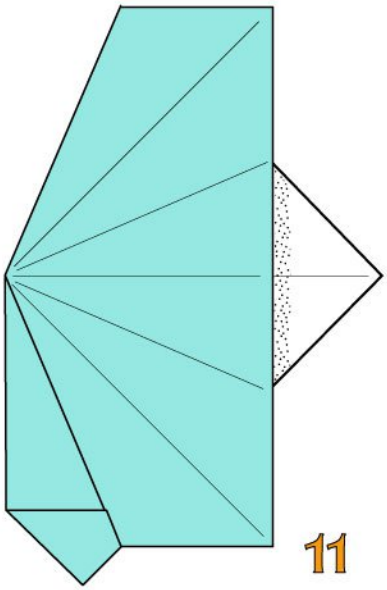
Una piega a valle e ruotate



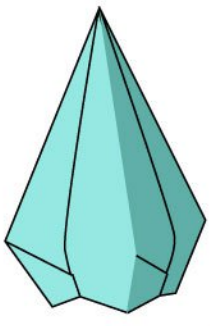
Una piega a monte e ruotate



Una piega a monte e ruotate
intascando e bloccando



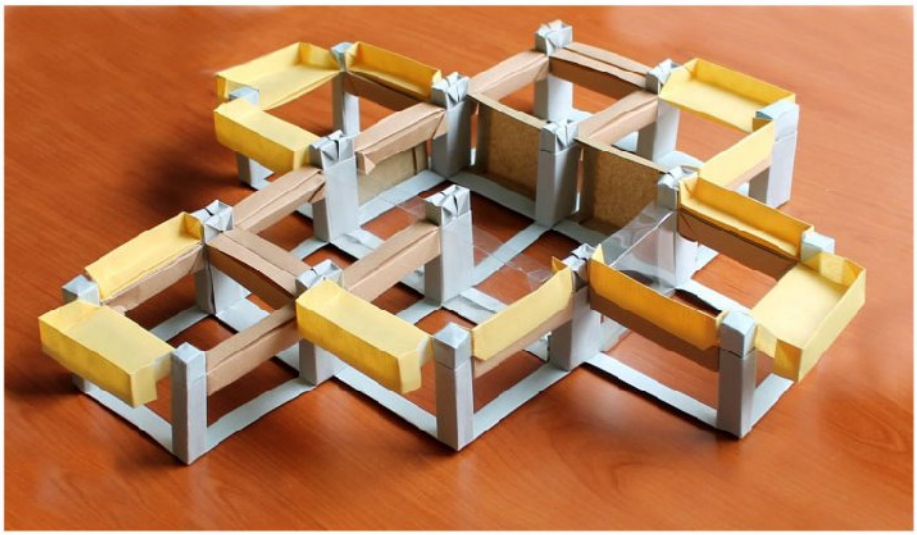
Anche per gli altri 3 vertici ripetete
le operazioni delle fig. da 4 a 10



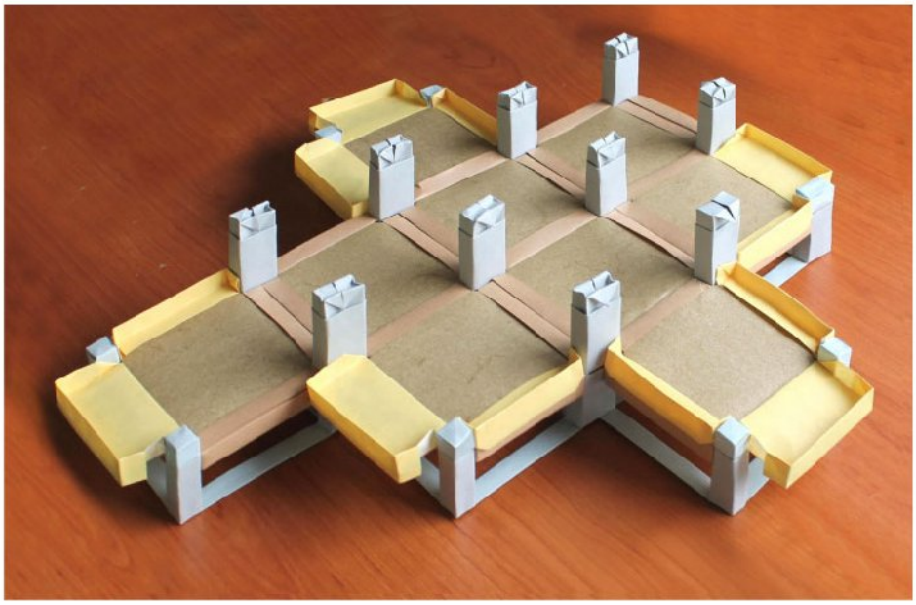
Cipresso ultimato

ESEMPIO DI COSTRUZIONE DI UNA VILLA MODERNA

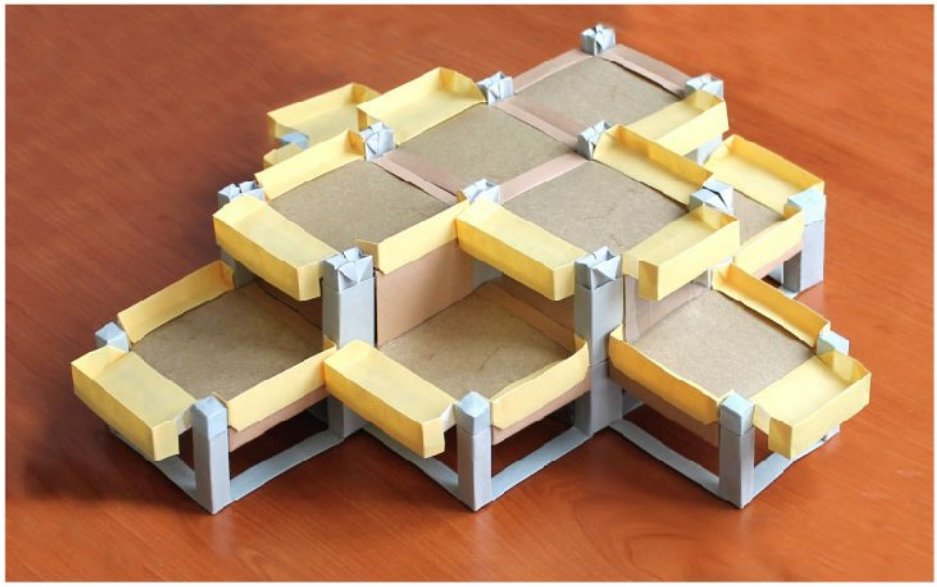
Stati d'avanzamento



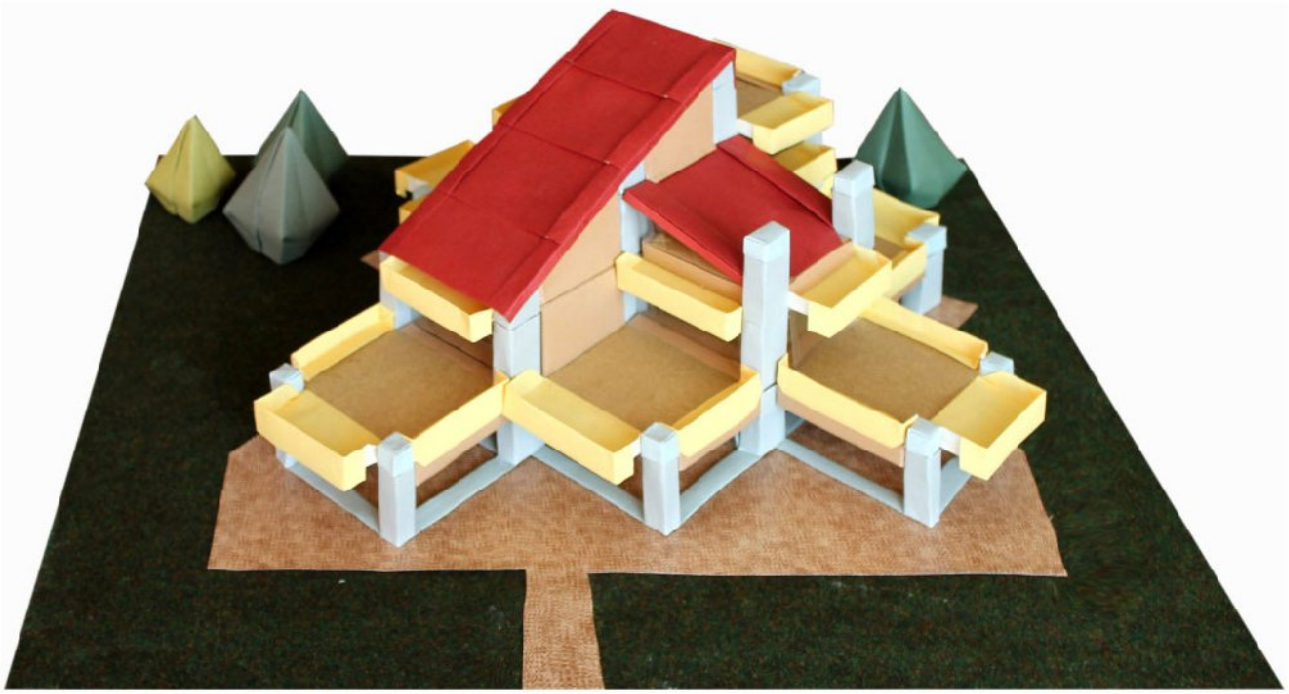
Fondazioni, pareti pianoterra, travi e poggioli piani primo



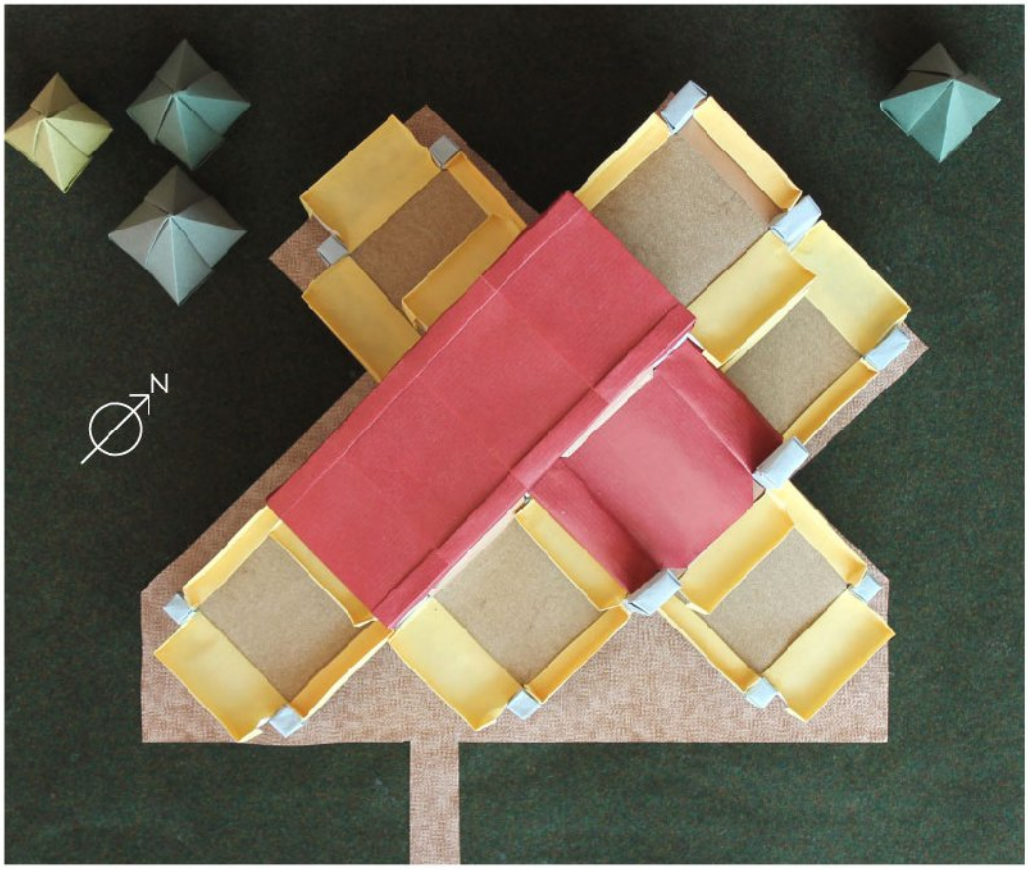
Solaio e pilastri piano primo



Pareti piano primo, solaio e poggioli piano secondo



Villa ultimata



Pianta



Prospetto Sud-Est



Prospetto Est



Prospetto Sud



Prospetto Sud-Ovest



Prospetto Nord-Est

PUBBLICAZIONI DI FRANCO PAVARIN

Aerei , jet ed astronavi di carta volanti	IL CASTELLO	1986
Origami animati	"	1987
Origami maschere animate	"	1988
Decorazioni modulari con origami modulati	"	1989
Origami motoscafi navi barche e velieri	"	1990
Origami scatole e contenitori	"	1990
Pieghe forme e colori	"	1994
Aerei e navi di carta	FABBRI	1996
Fold and fly Paper airplanes	STERLING PUBLISHING	1998
Manuale rapido di aerei di carta volanti	FABBRI	2000
Aerei di carta 17 modelli volanti inediti	IL CASTELLO	2001
Aviones voladores	TUTOR S.A.	2003
17 modelos ineditos de aviones voladores	"	2004
Naves voladoras	"	2006
Quaderni Quadrato magico n.20 e 48	CDO	
Maschere, elmi e copricapi	web	2010
Maschere trasformabili	web	2011
21 nuovi aerei origami volanti	web	2014
Maschere origami 3D volume 1	web	2014
Maschere origami 3D volume 2	web	2015
Quaderni Quadrato Magico n. 54 e 56	CDO	
Composizione modulare 1	web	2016
Manuale dell'architetto origamista	web	2016



Prospetto Sud-Est



Prospetto Est

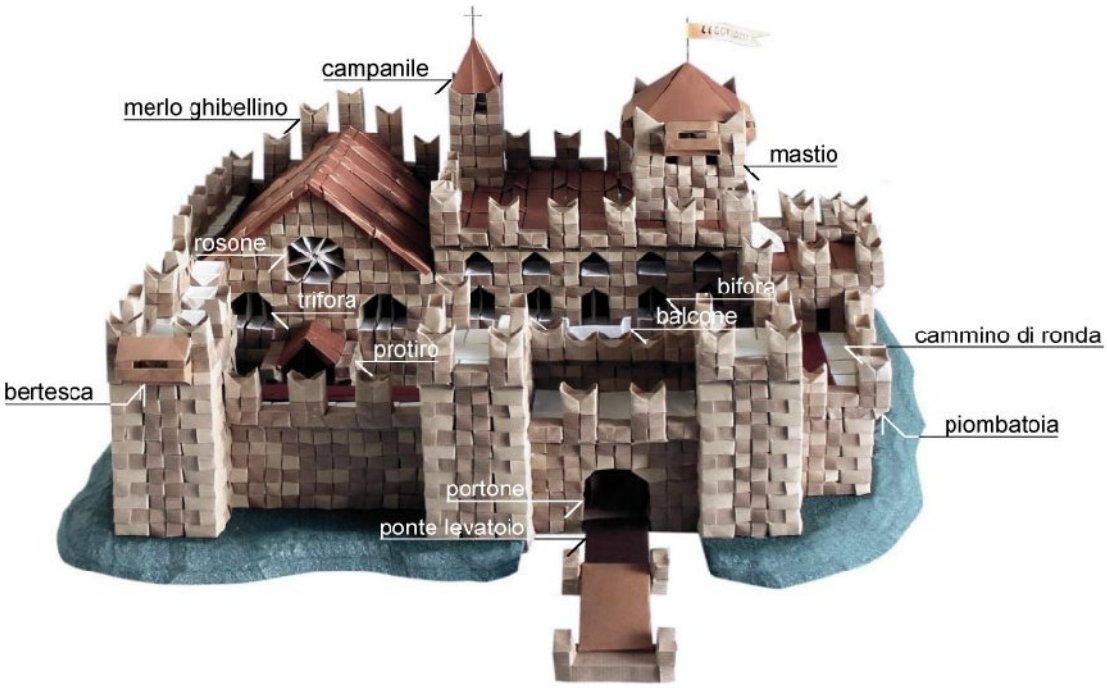


Prospetto Sud



Prospetto Sud-Ovest

CON I CONSIGLI DI QUESTO MANUALE È POSSIBILE REALIZZARE, PIEGANDO MINUSCOLI FOGLI DI CARTA, VILLE ED EDIFICI MODERNI, CASE, CHIESE E CASTELLI MEDIOEVALI



Franco Pavarin

www.aereiemaschereorigami.altervista.org