

ARHITEKTONSKI TEHNIČAR

ARHITEKTONSKE KONSTRUKCIJE 1.r



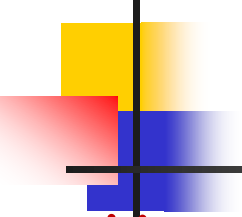
Nastavna cjelina: ZIDANI ZIDOVİ

Nastavna jedinica:

Zidovi od opeke

Danijela Đurić, dipl.ing.arh.

ZIDOVI OD OPEKE

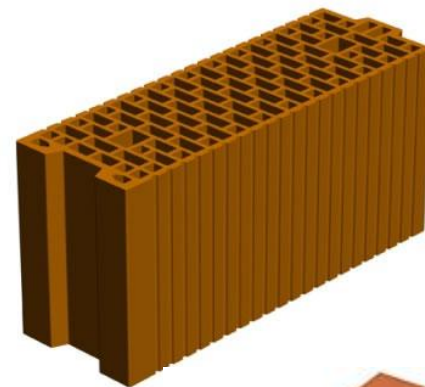


Karakteristike zidova od opeke normalnog formata (NF) su:

- Duga tradicija građenja
- Prirodni materijal
- Jednostavna ugradba
- Dobra zvučna i toplinska izolacija
- Mogu se graditi nosivi i nenosivi zidovi

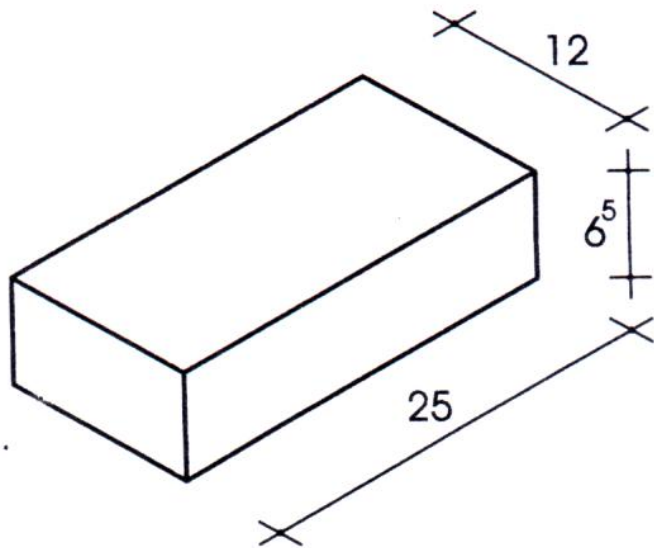
ZIDOVI OD OPEKE

- Zidovi od opeke zidaju se od:
 - Obične pune opeke,
 - Raznih vrsta šupljih opeka i
 - Opekarskih blokova te
 - radijalne i lake opeke.
- Zidanje se vrši vapnenim, produženim ili cementnim mortom



OSNOVNE DIMENZIJE OPEKE NF

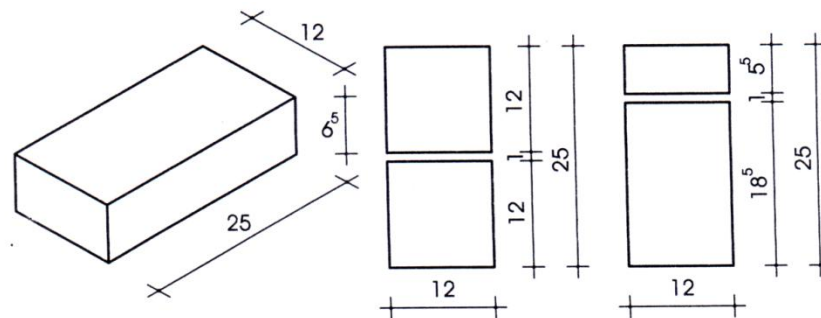
normalna, klasična ili puna opeka (NF) ima
dimenzije **25x12x6,5cm**

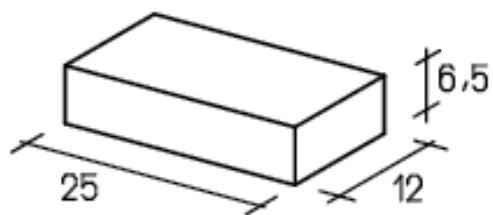


OSNOVNE DIMENZIJE OPEKE NF

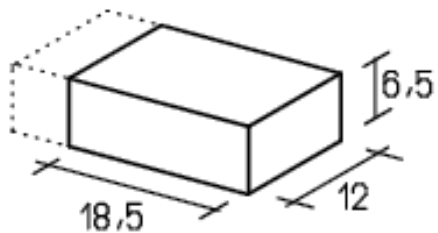
- Pri zidanju opekom NF koriste se sljedeći dijelovi opeke:

- tročetvrtinka 18,5x12x6,5cm
- polovina 12,0x12x6,5cm
- četvrtina 5,5x12x6,5cm
- remenjak 25x5,5x6,5cm

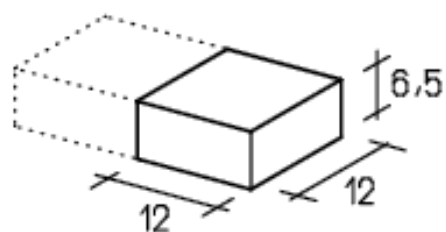




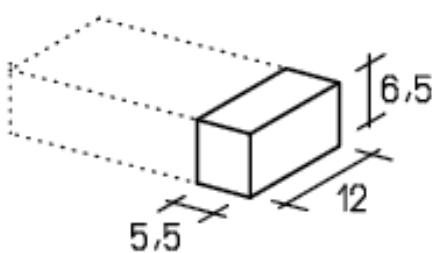
PUNA OPEKA



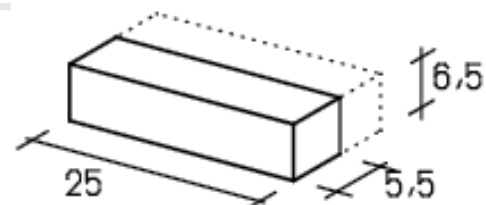
TROČETVRTINKA



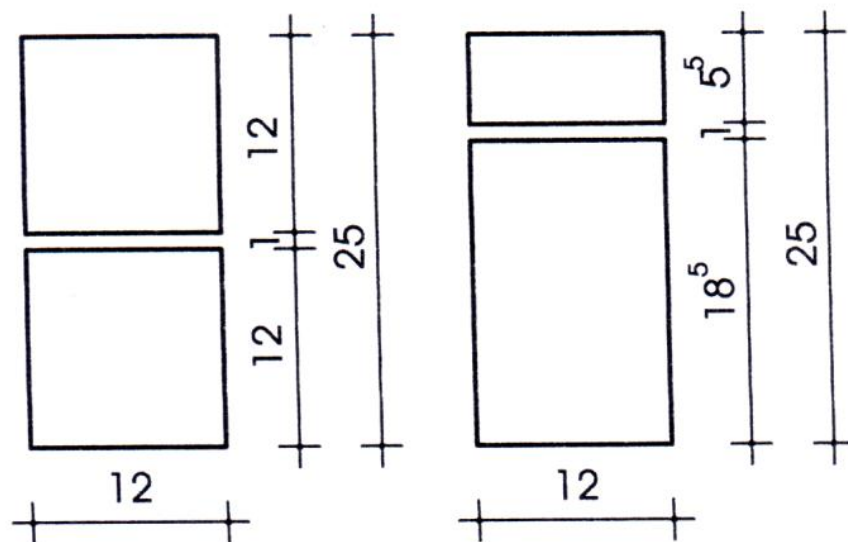
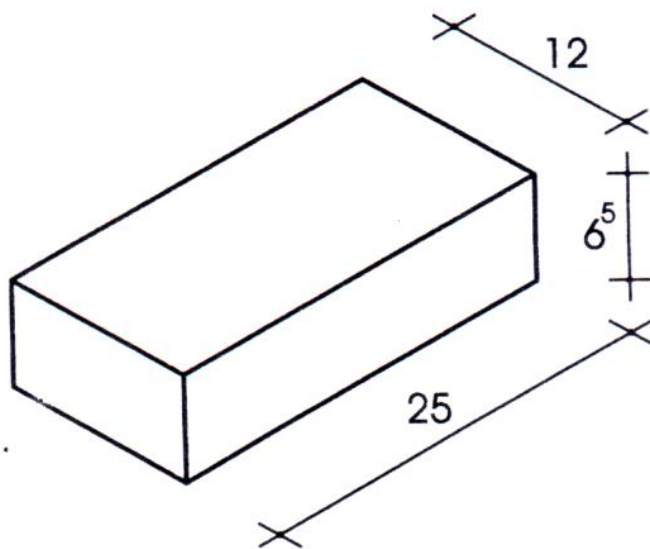
POLOVINA



ČETVRTINA

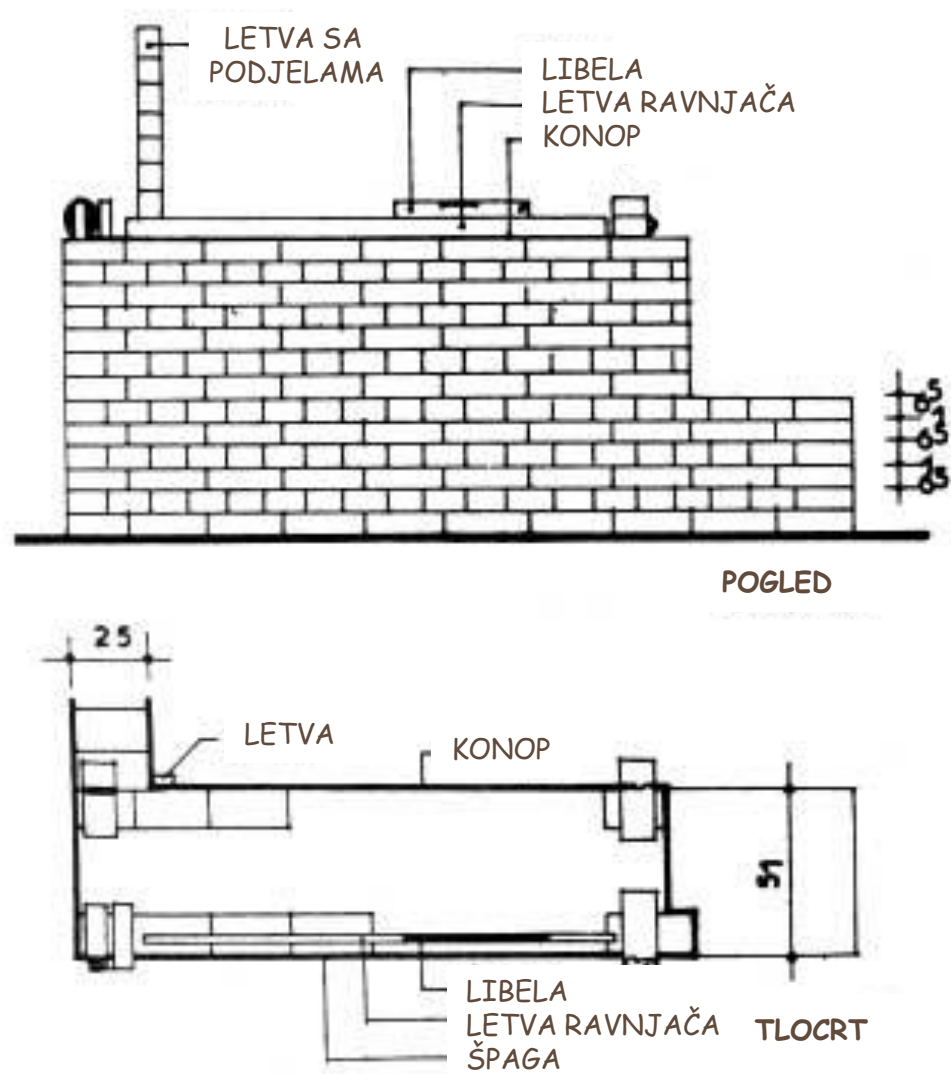


REMENJAK

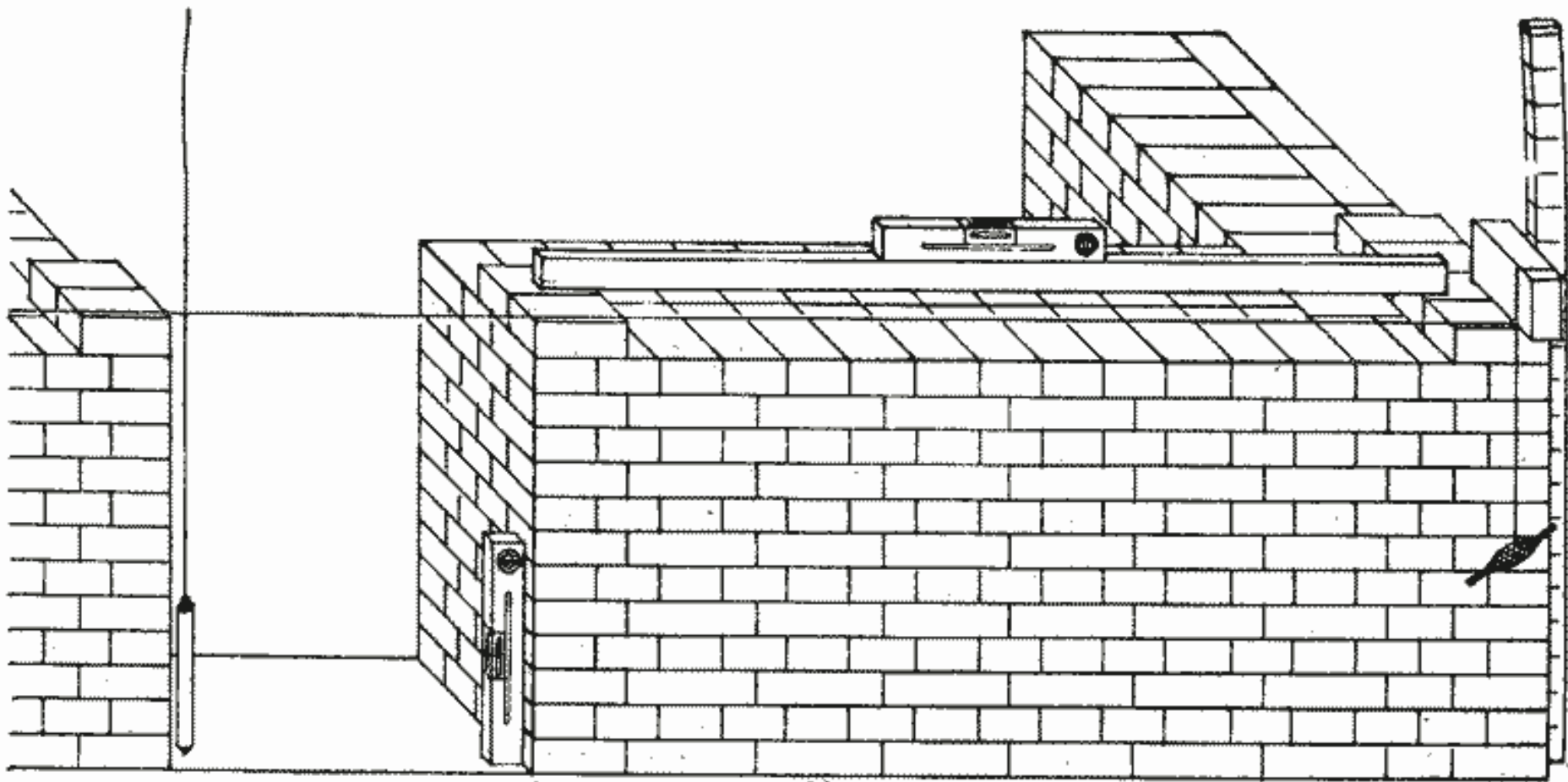


PRAVILA ZIDANJA OPEKOM NF

1. Prilikom zidanja zidova opekrom NF treba paziti da svaki red bude vodoravan.



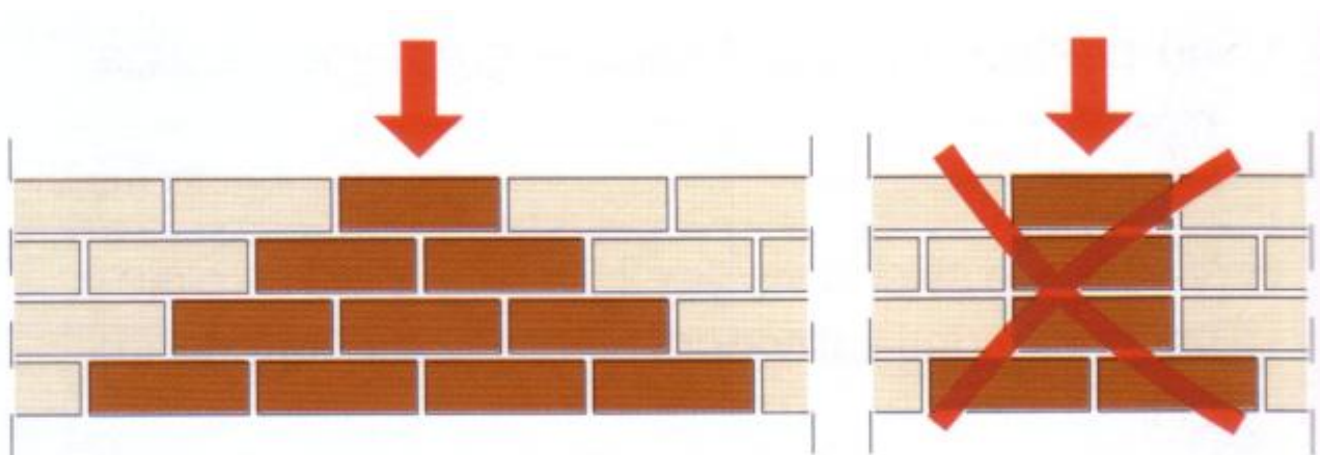
PRAVILA ZIDANJA OPEKOM NF



Sl. 290. Aksonometrijska slika dijela zida s uglom i otvorom, sa spravama i pomagalicima potrebnim kod zidanja

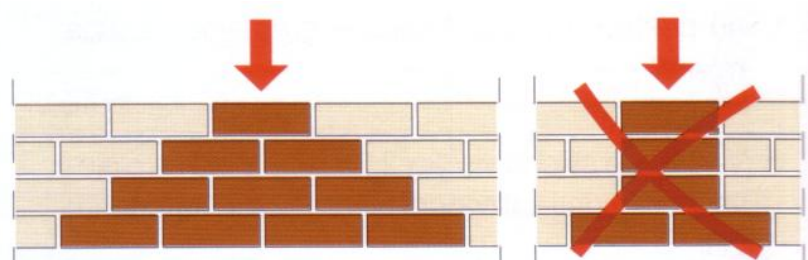
PRAVILA ZIDANJA OPEKOM NF

2. Reške ili fuge u dva sloja ne smiju se preklapati, moraju biti razmaknute najmanje za četvrtinu opeke



Tijek (pružanje) režaka utječe na podjelu tereta

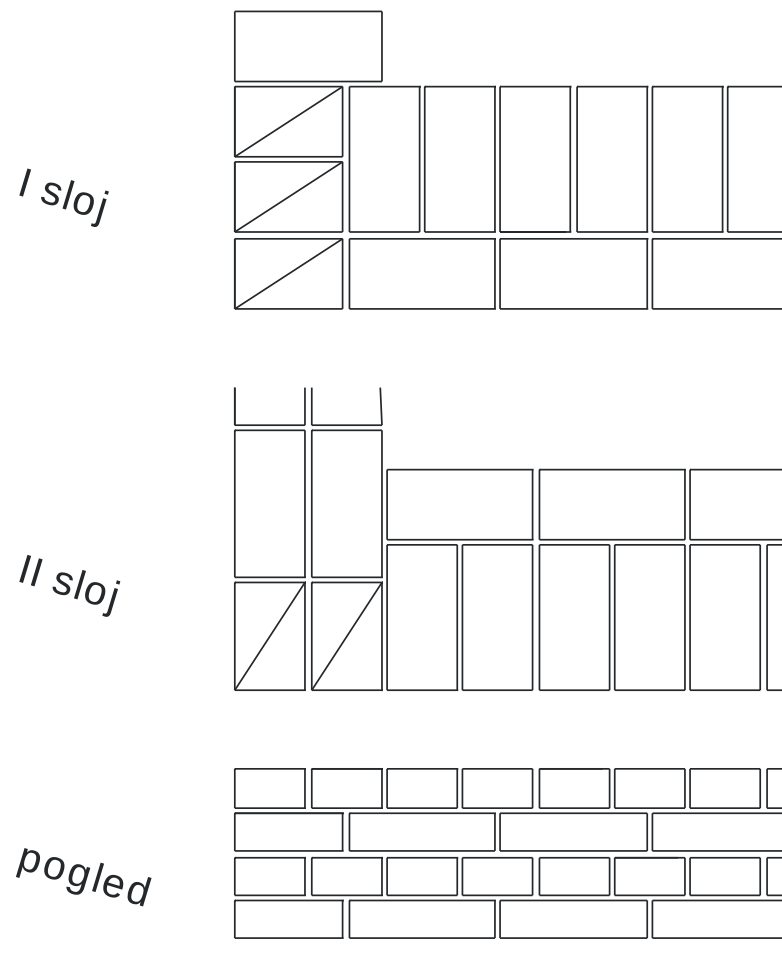
PRAVILA ZIDANJA OPEKOM NF



- Horizontalne spojnice nazivaju se **LEŽAJNICE**
 - prosječna im je debljina 12mm.
- Vertikalne spojnice nazivaju se **SUDARNICE**
 - prosječna debljina im je 10mm.

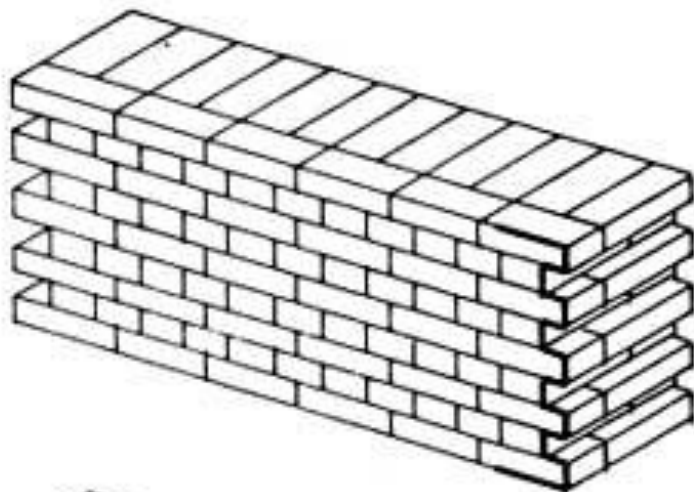
PRAVILA ZIDANJA OPEKOM NF

3. Svi neparni slojevi jednaki su prvom a svi parni drugom sloju
4. Na licu zida izmjenjuju se **uzdužnjaci i vežnjaci**
5. U zidu mora biti što više cijelih komada opeke
6. Kod debelih zidova treba upotrijebiti što više **vežnjaka**.

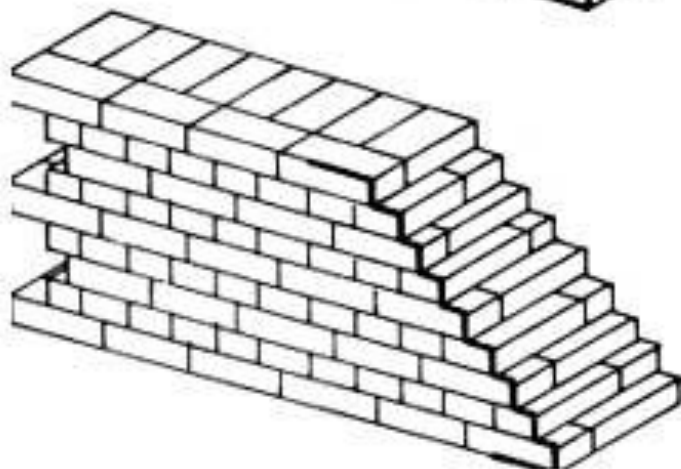


PRAVILA ZIDANJA OPEKOM NF

7. Prekid zida



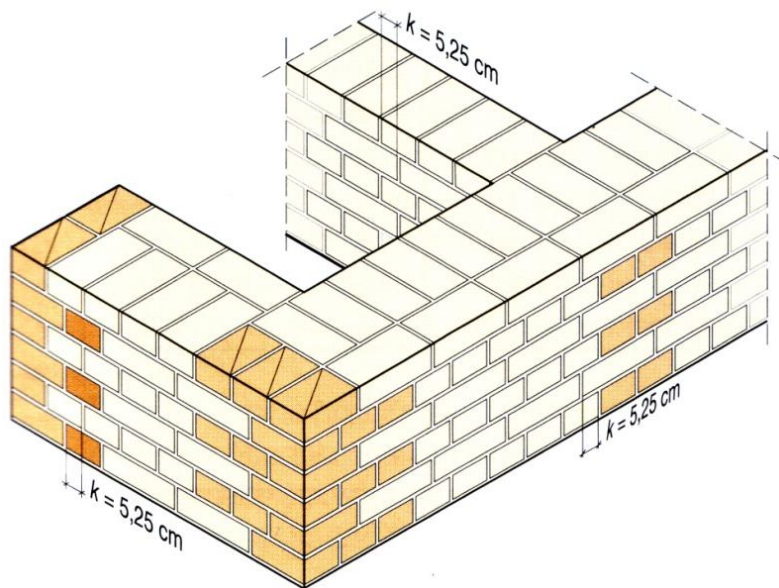
zupčast
prekid
zida



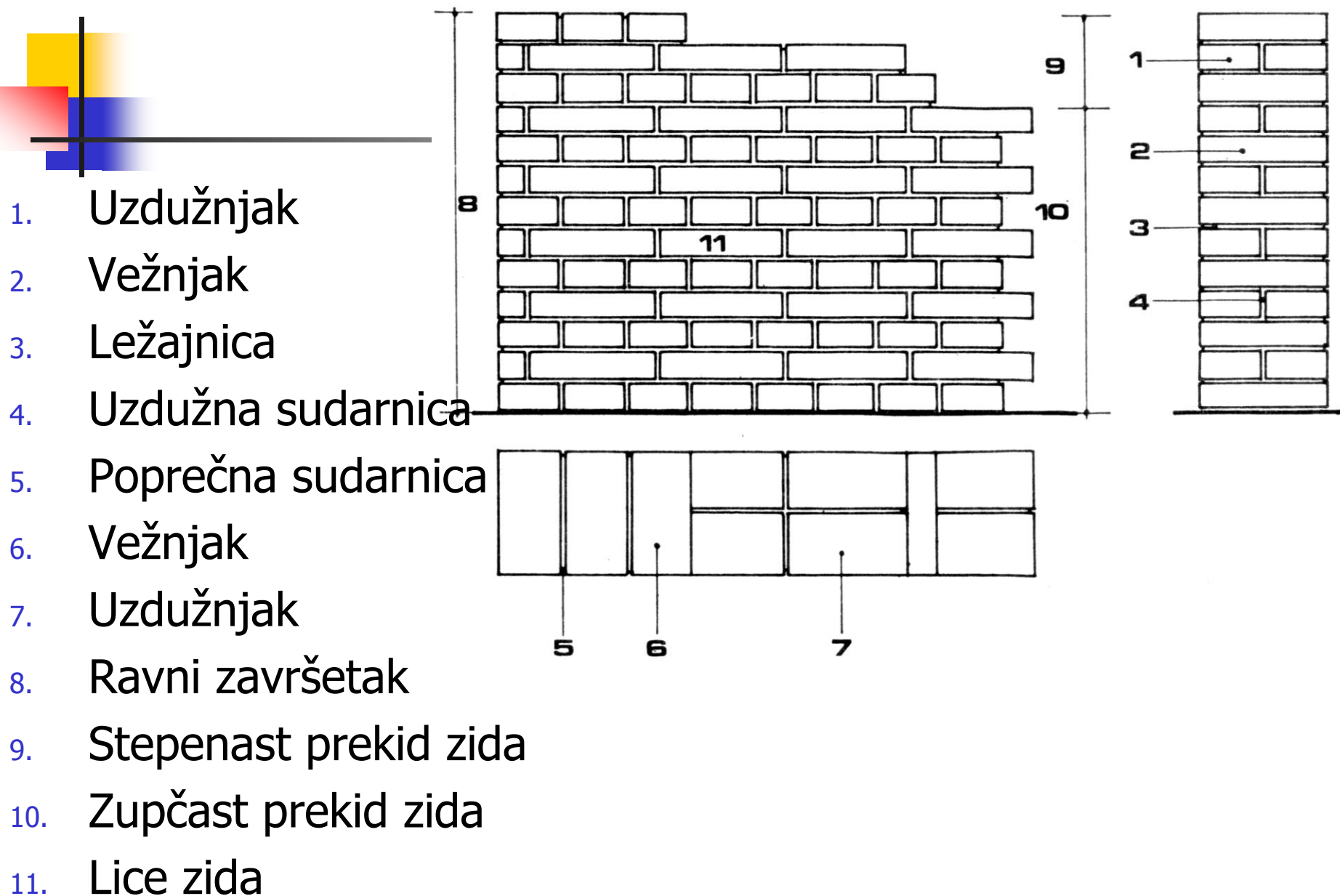
stepenast
prekid
zida

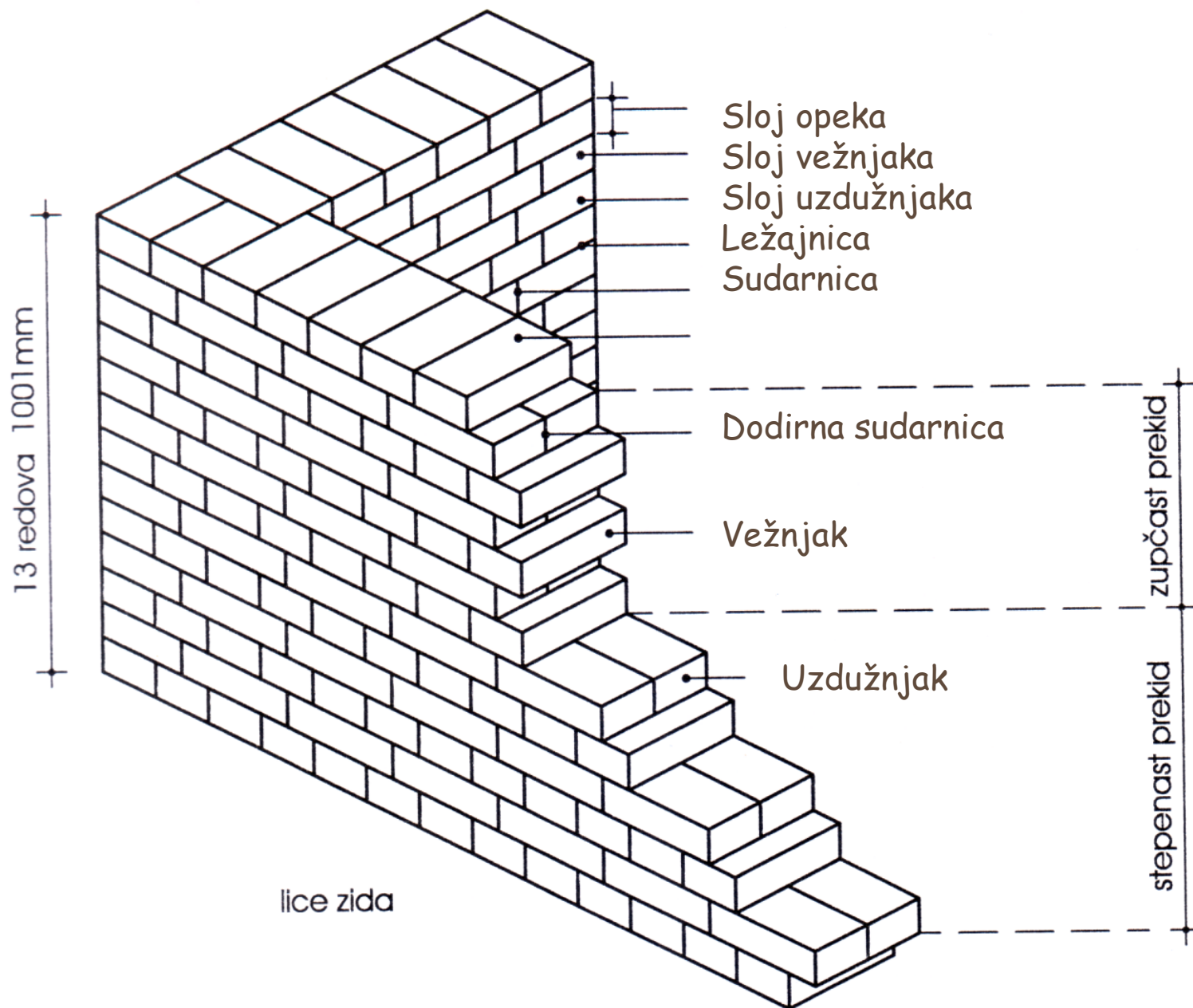
Dijelovi zida od opeke NF

- **Vežnjaci** su opeke koje su smještene okomito na smjer pružanja zida.
- **Uzdužnjaci** su opeke koje su smještene paralelno smjeru pružanja zida



Dijelovi zida od opeke NF









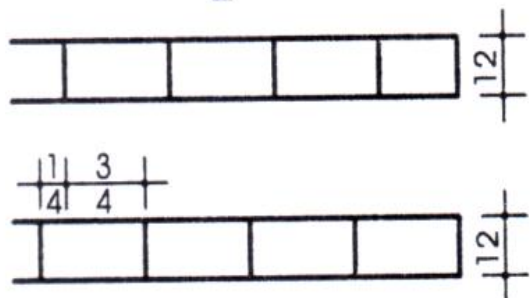
Vezovi opeke

- Početak zida
 - Pregradni zidovi: 6,5cm (rijetko) i 12cm
 - Nosivi zidovi: 25cm, 38cm, 51cm, 64cm
- Ugao
- Sudar dva zida
- Križanje

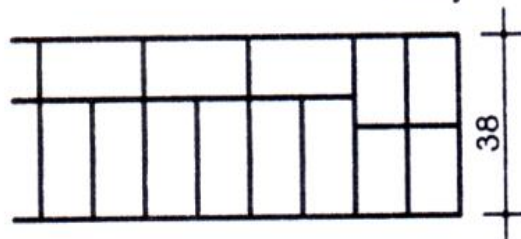
Slogovi zidova od opeke NF

Početak zida

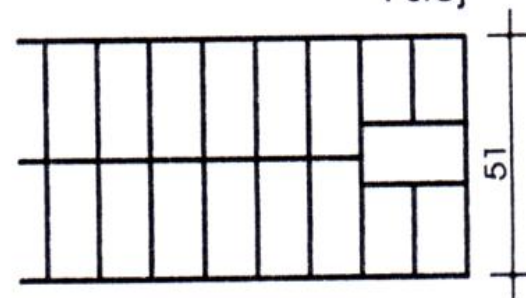
zid od $\frac{1}{2}$ opeke



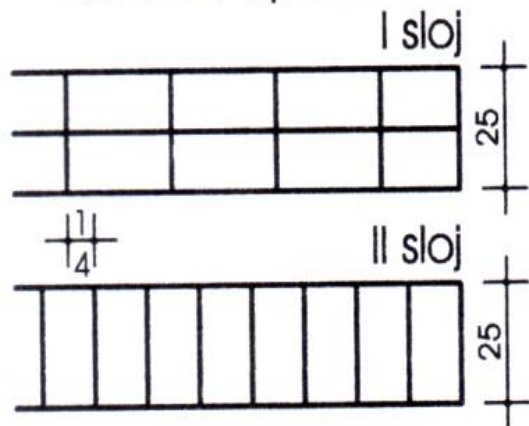
I sloj



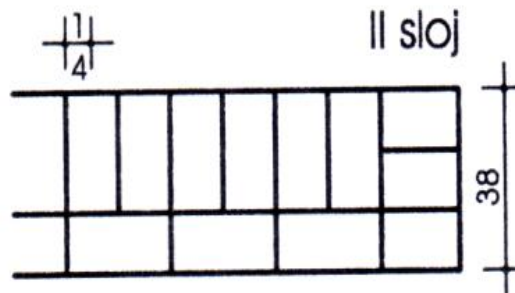
I sloj



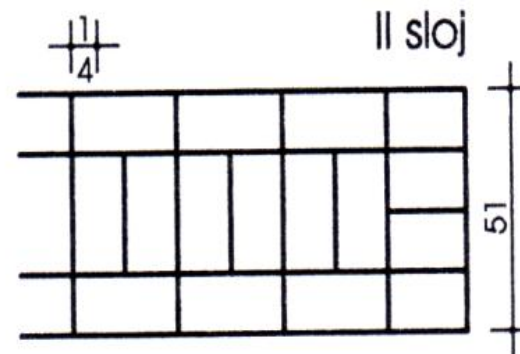
zid od 1 opeke



zid od $1\frac{1}{2}$ opeke



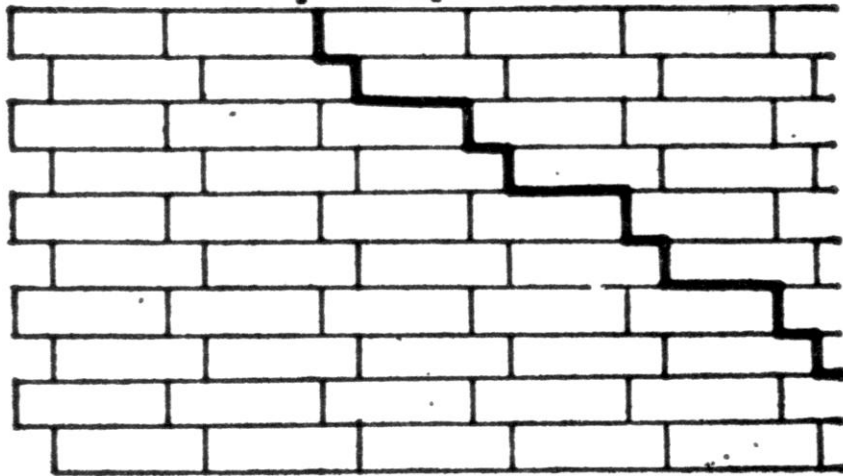
zid od 2 opeke



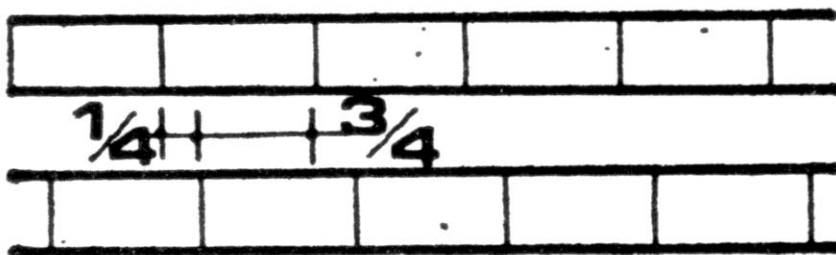
Početak zida širine 12cm

1) slog dužnjaka prevez $\frac{1}{4}$ i $\frac{3}{4}$

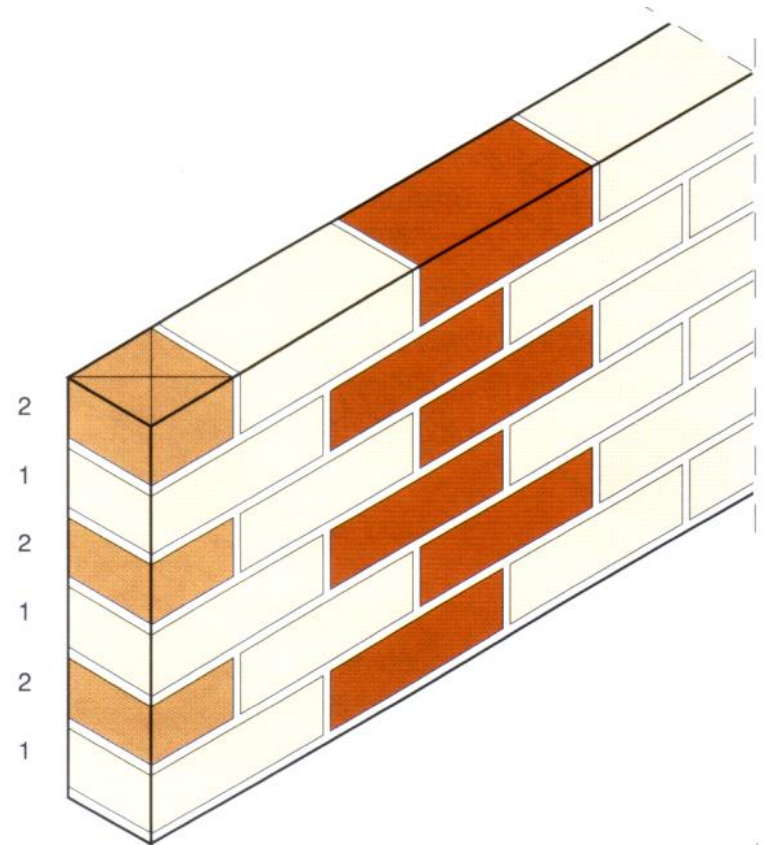
$\frac{1}{4}$ + $\frac{3}{4}$



$\frac{1}{4}$ +



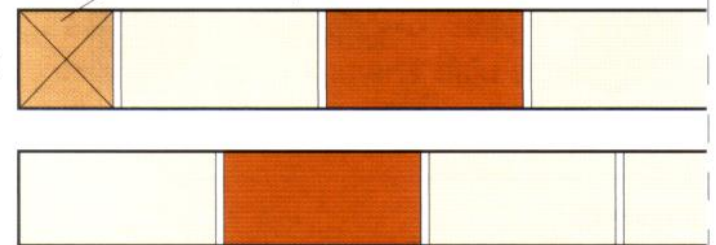
12



1/2 kamena na početku zida

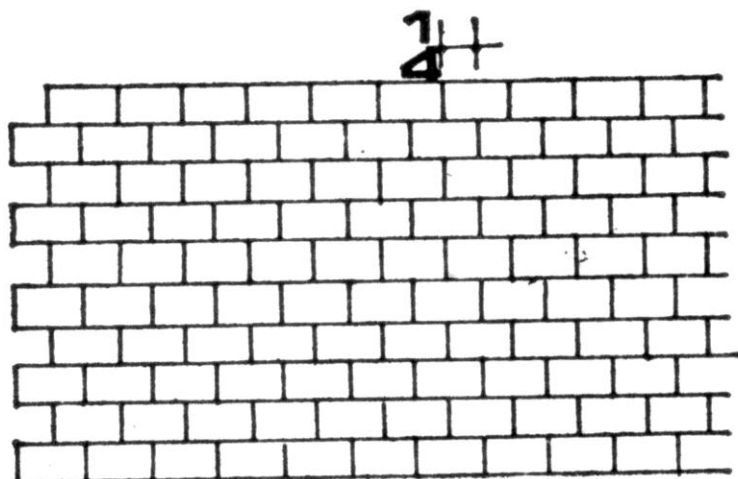
2. sloj

1. sloj

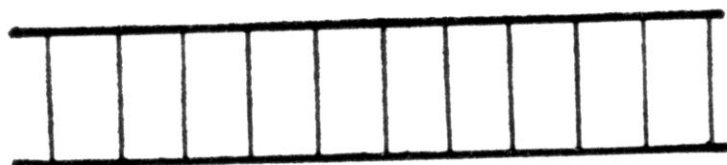


Početak zida širine 25cm

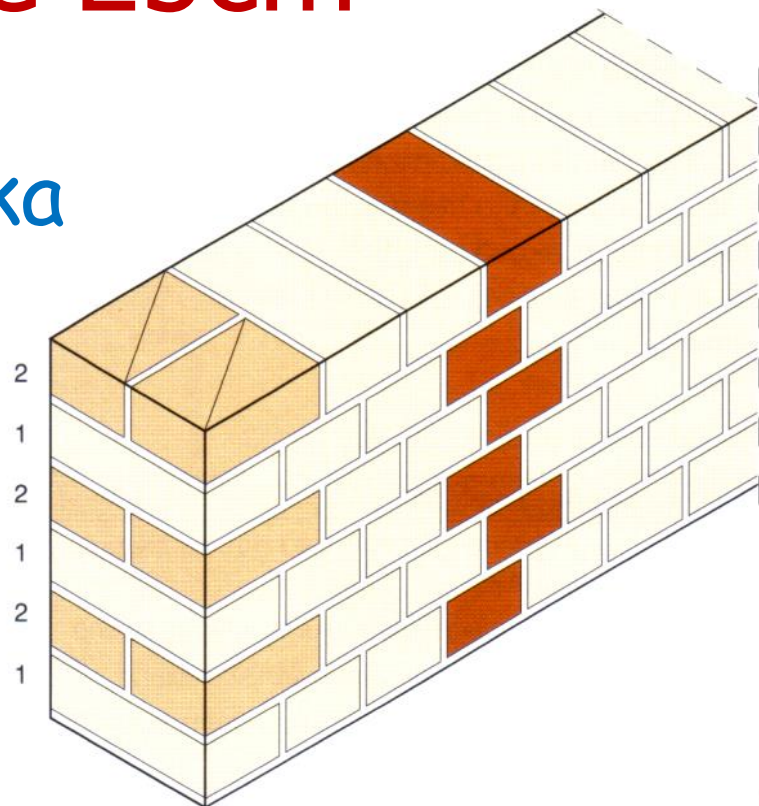
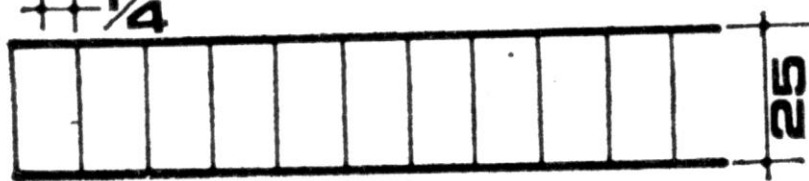
Slog samo vežnjaka



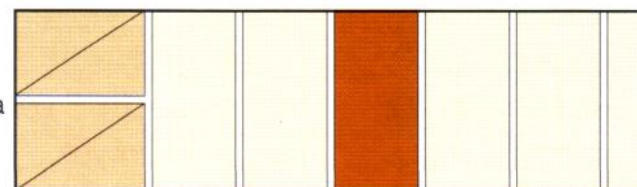
4



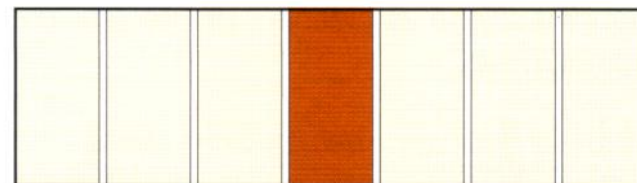
1/4



2. sloj
(3/4 kamena na početku zida)

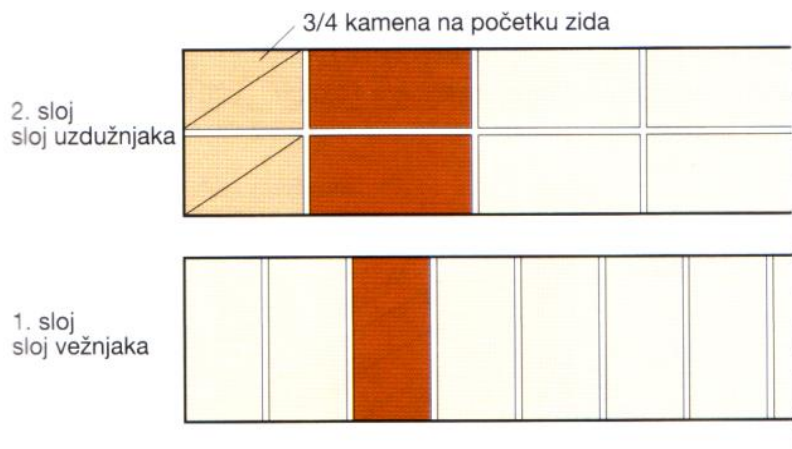


1. sloj

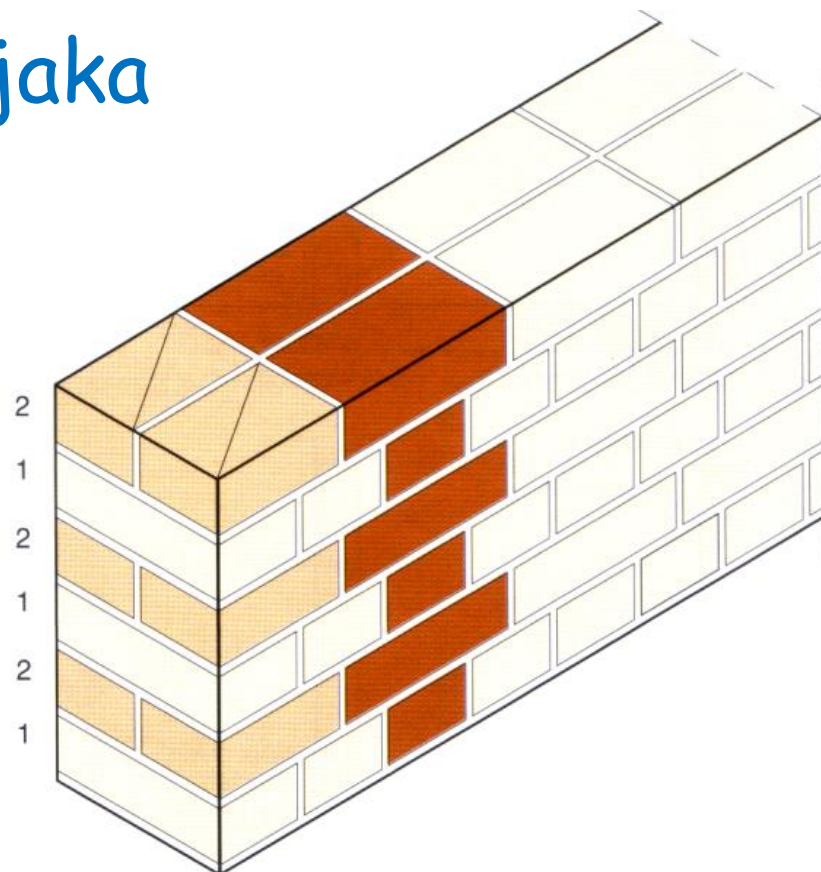


Početak zida širine 25cm

Slog vežnjaka i uzdužnjaka



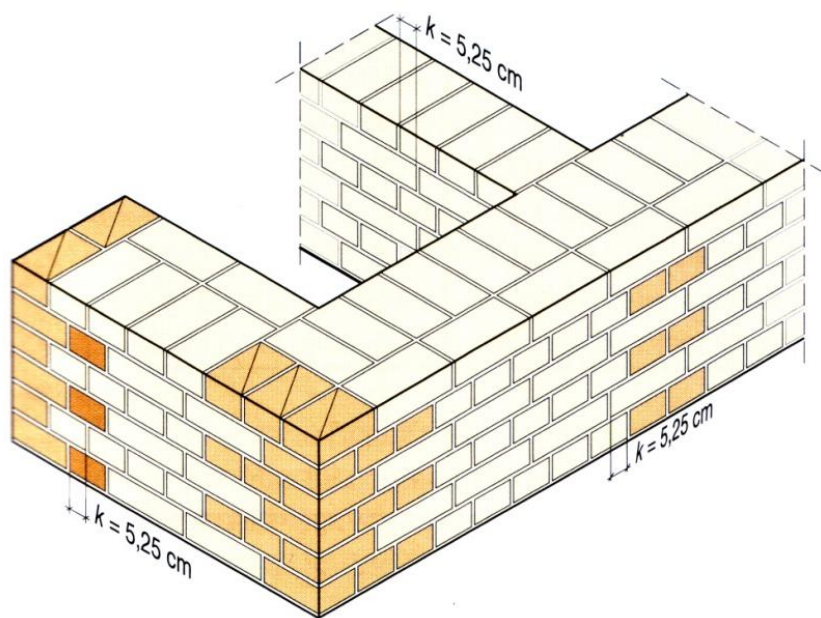
Ukrižni vez za zide od 24 cm (format NF)



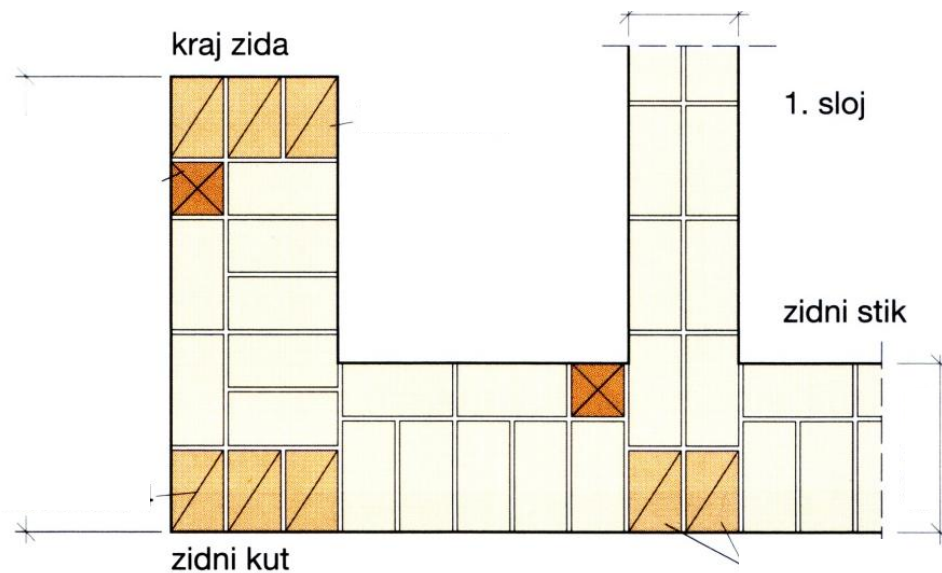
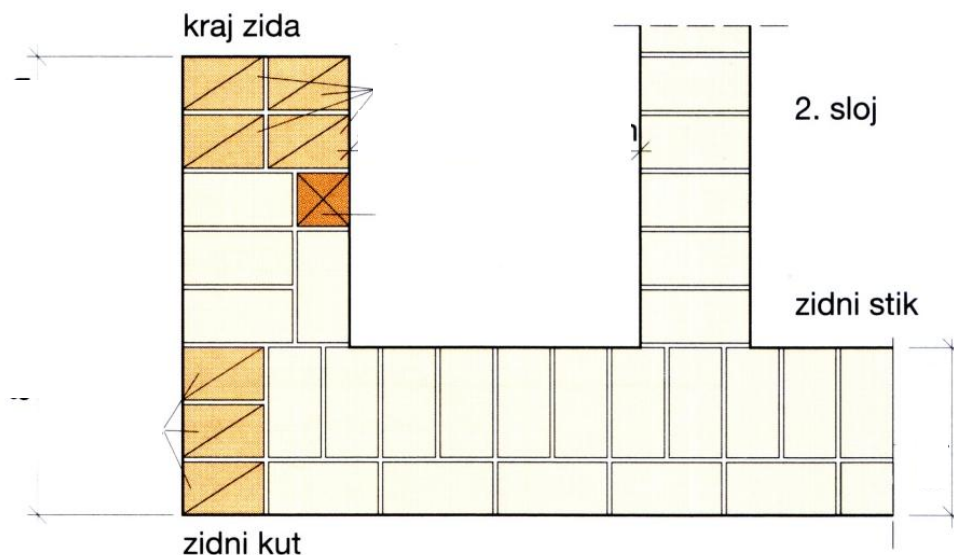
Križni vez zida debljine 25cm

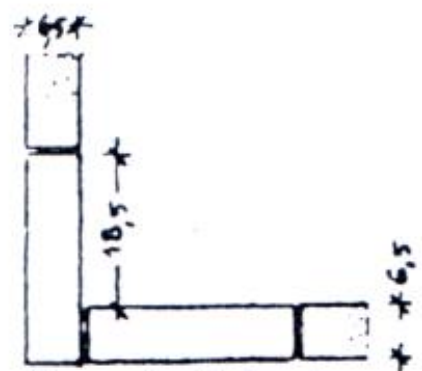
Spoj zidova od opeke NF

Sudar zidova
š=38cm i 25cm

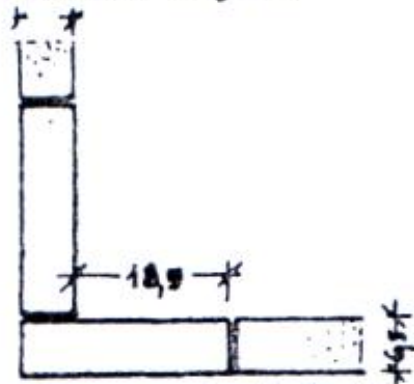


Ugao zidova š=38cm



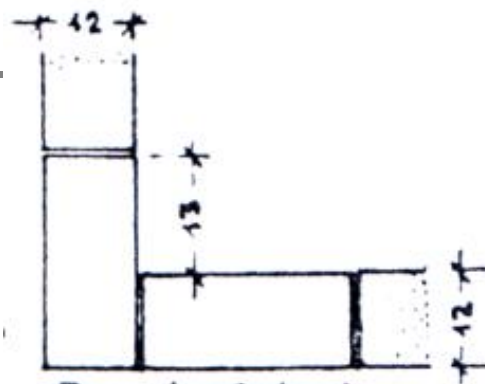


Parni slojevi

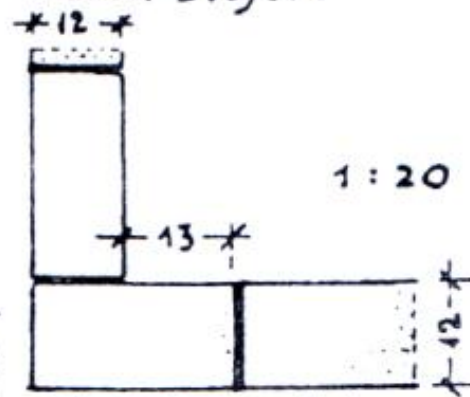


Neparni slojevi

(a) ...Zidovi d. 6.5 cm

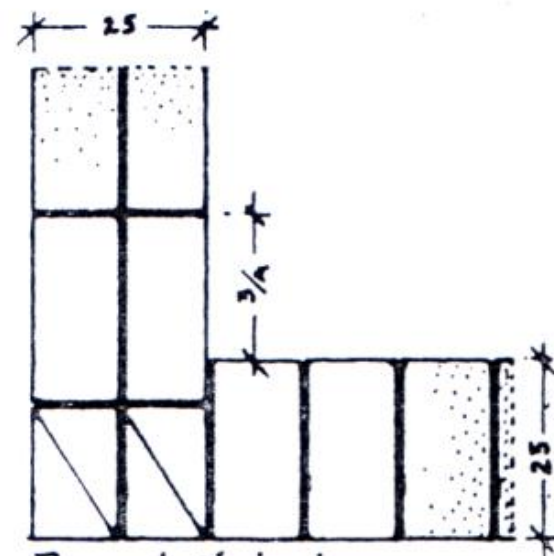


Parni slojevi

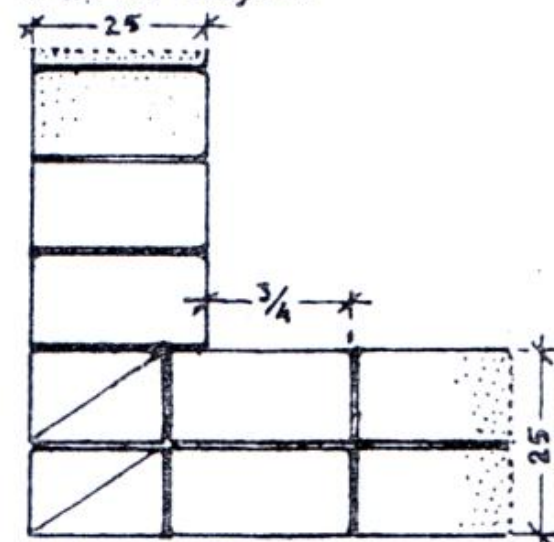


Neparni slojevi

(c) ...Zidovi d. 12 cm

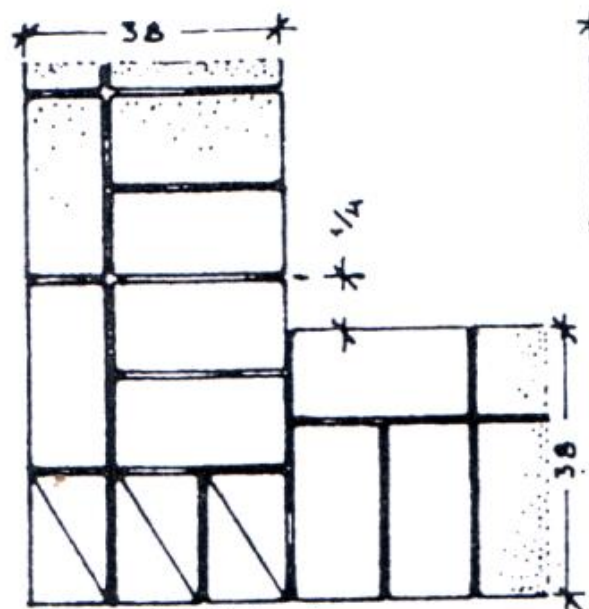


Parni slojevi

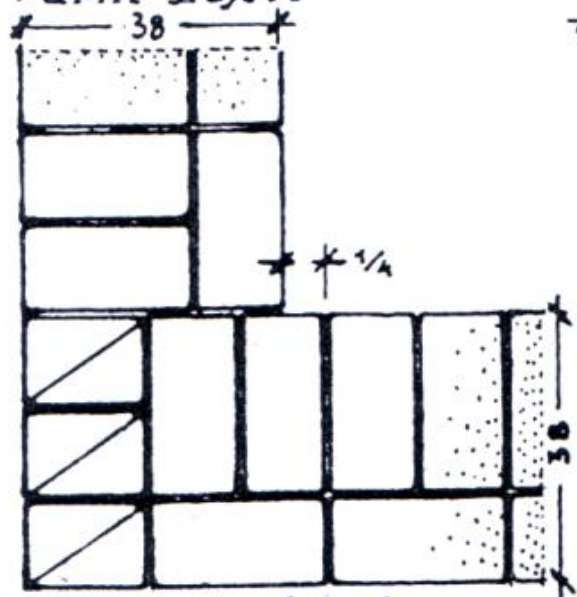


Neparni slojevi

(a) ...Tročetvrtinsko
/tradicionalno/
sлагanje

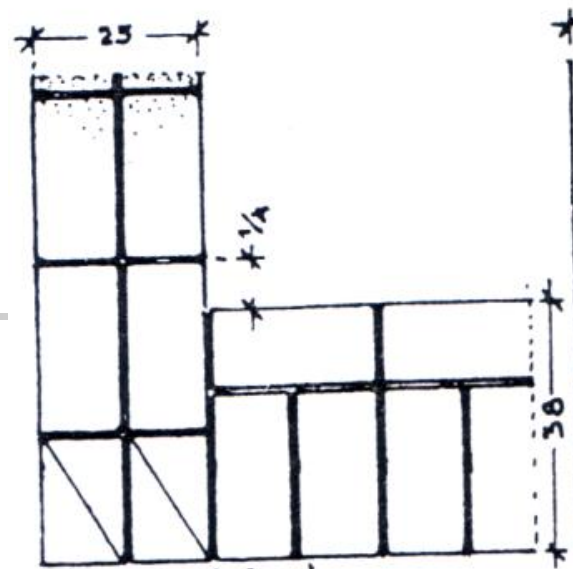


Parni slojevi

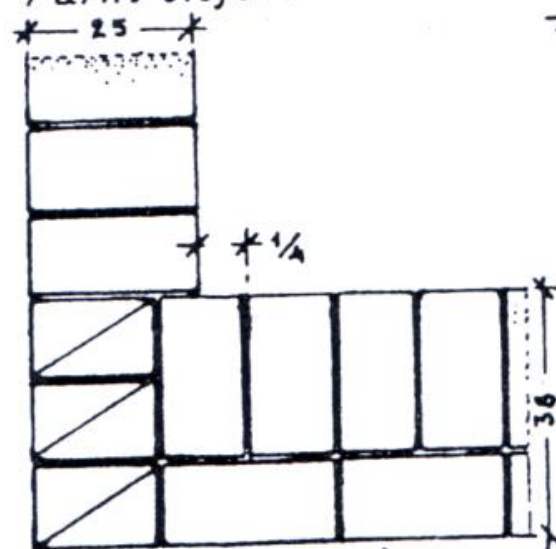


Neparni slojevi

Ⓐ...Tročetvrt. slaganje



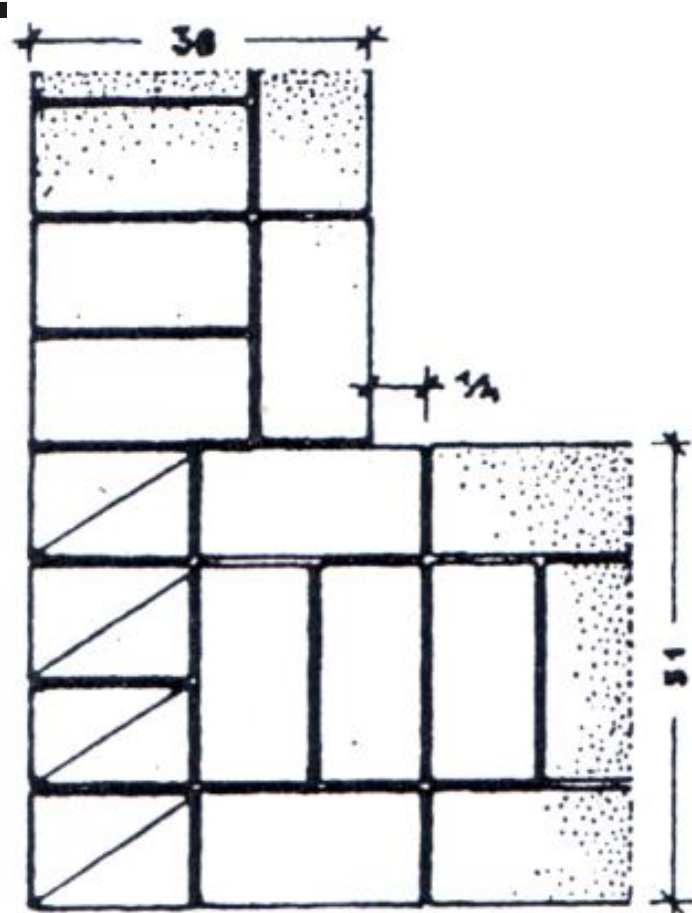
Parni slojevi



Neparni slojevi

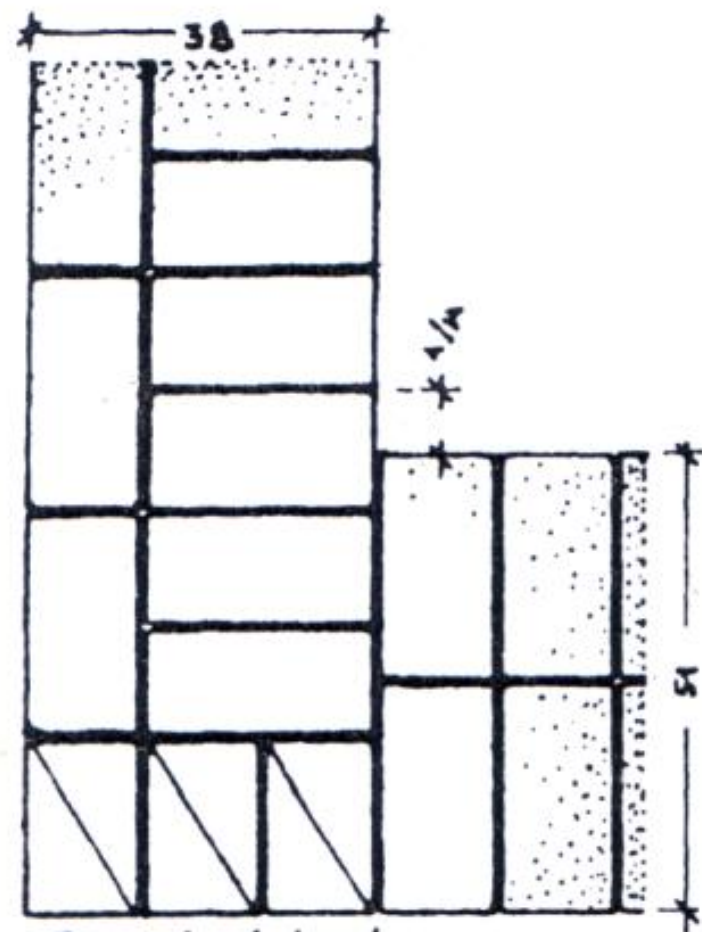
Ⓐ...Tročetvrtinsko
/tradicionalno/
slaganje

(1)



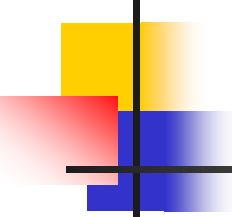
Neparni slojevi

Ⓐ ... Tročetvrtinsko
slaganje



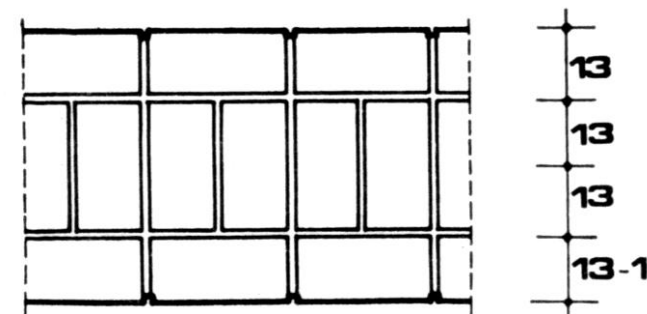
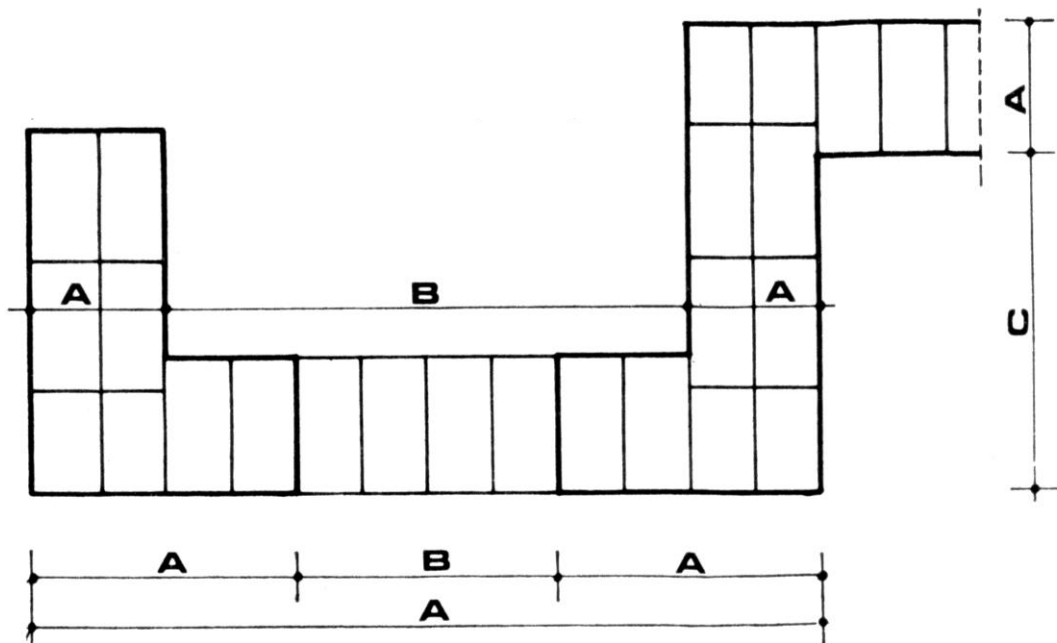
Parni slojevi

ZIDOVI OD OPEKE

- 
-
- Debljina nosivih zidova:
 - najmanje 25cm ako zidamo šupljom opekom
 - najmanje 38 cm ako zidamo punom opekom.

MODULARNA KOORDINACIJA

DIMENZIONIRANJE ZIDOVA OD OPEKE NF



A-vanjska mjera $A=n \times 13-1$

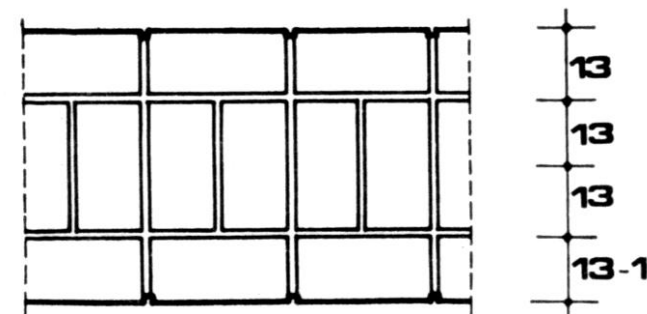
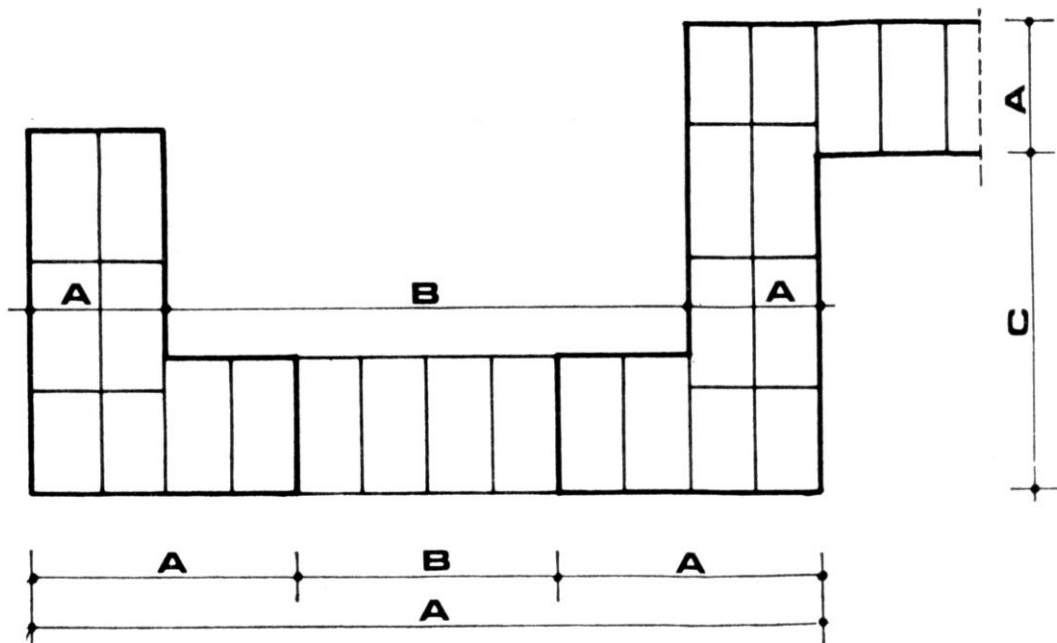
B-unutarnja mjera $B=n \times 13+1$

C-poluotvorena mjera $C=n \times 13$

Nacrtaj u mjerilu 1:10 1. i 2. sloj zida

MODULARNA KOORDINACIJA

DIMENZIONIRANJE ZIDOVA OD OPEKE NF



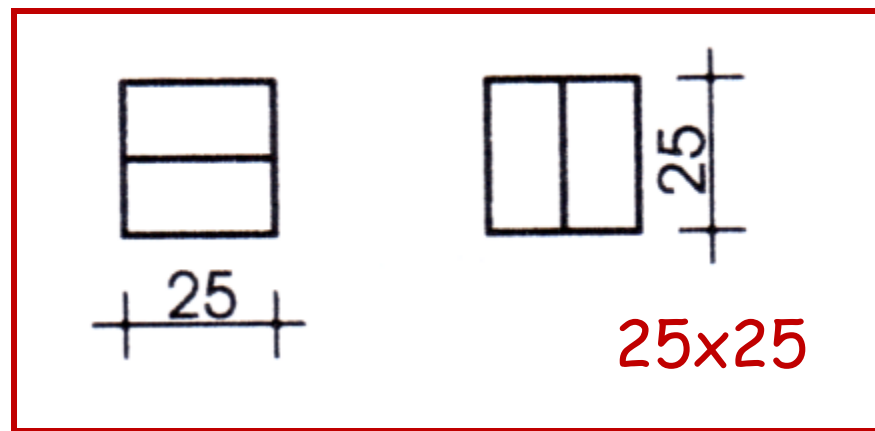
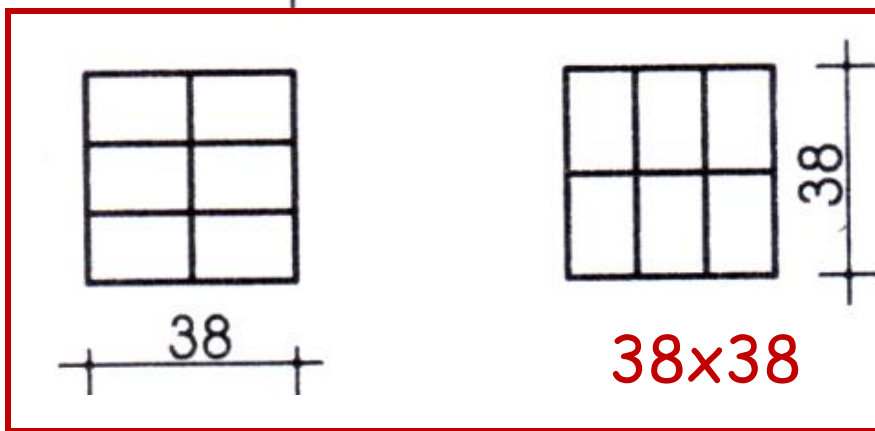
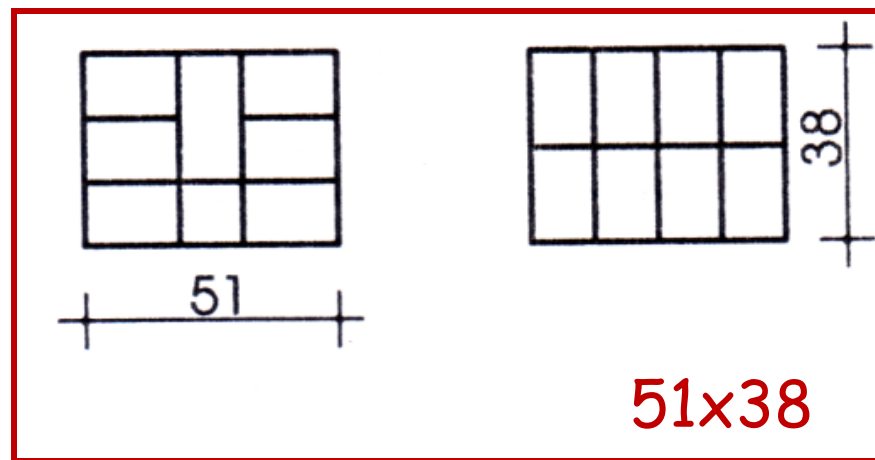
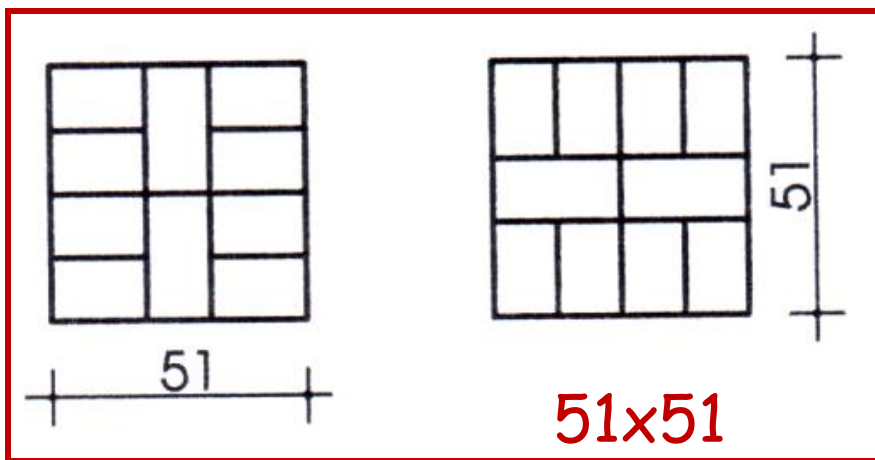
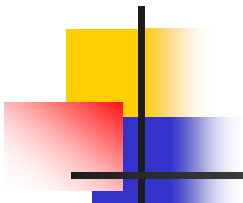
A-vanjska mjera $A=n \times 13-1$

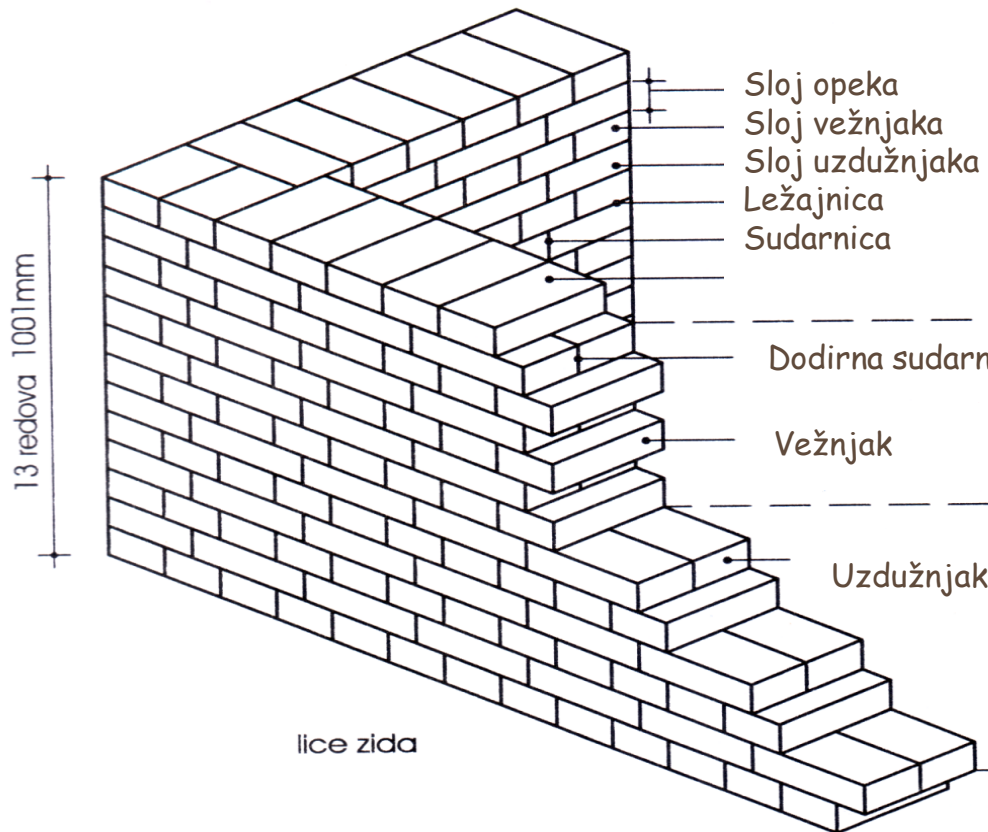
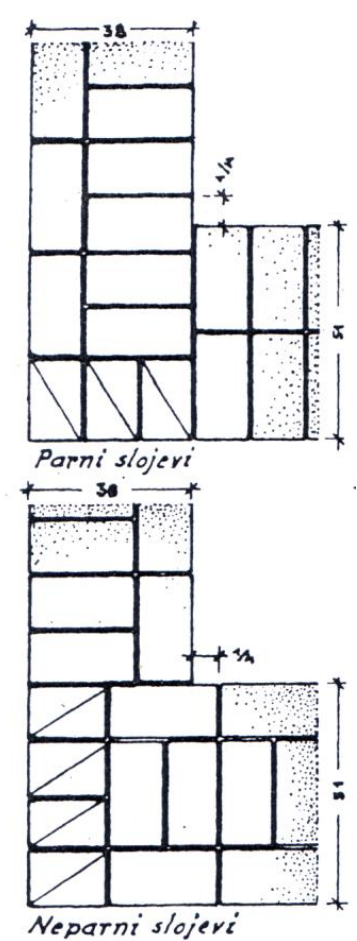
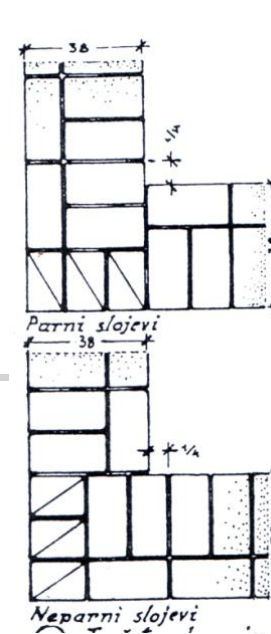
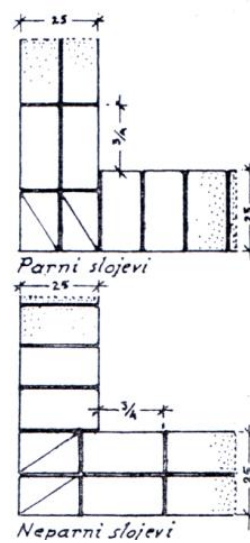
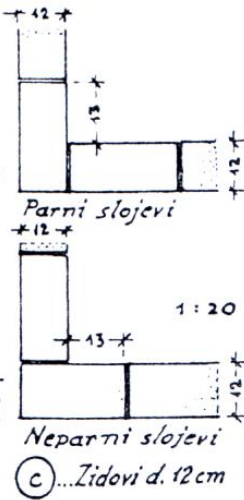
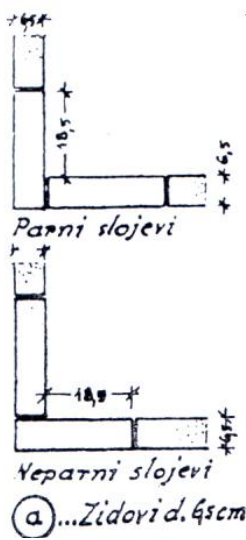
B-unutarnja mjera $B=n \times 13+1$

C-poluotvorena mjera $C=n \times 13$

Nacrtaj u mjerilu 1:10 1. i 2. sloj zida

STUPOVI OD OPEKE





Dodirna sudarnica

Vežnjak

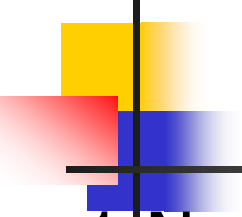
Uzdužnjak

zupčast prekid

stepenast prekid

Plakat na hameru

Školski program



1. Nacrtati tlocrte slojeva ugla dva zida + sudar u mjerilu 1:10 za zidove dimenzija:

A. $38 / 38 + 25$

B. $38 / 25 + 25$

C. $25 / 38 + 12$

D. $25 / 25 + 12$

E. $51 / 51 + 38$

F. $51 / 38 + 25$

G. $38 / 51 + 12$

2. Nacrtati slojeve u tlocrtu i aksonometriju zadana tri zida. Jednom bojom pobožati sve opeke $3/4$

3. Izračunati dijelove zida i kotirati.

4. Crtati olovkom na hamer papiru A3.

Kuće od opeke

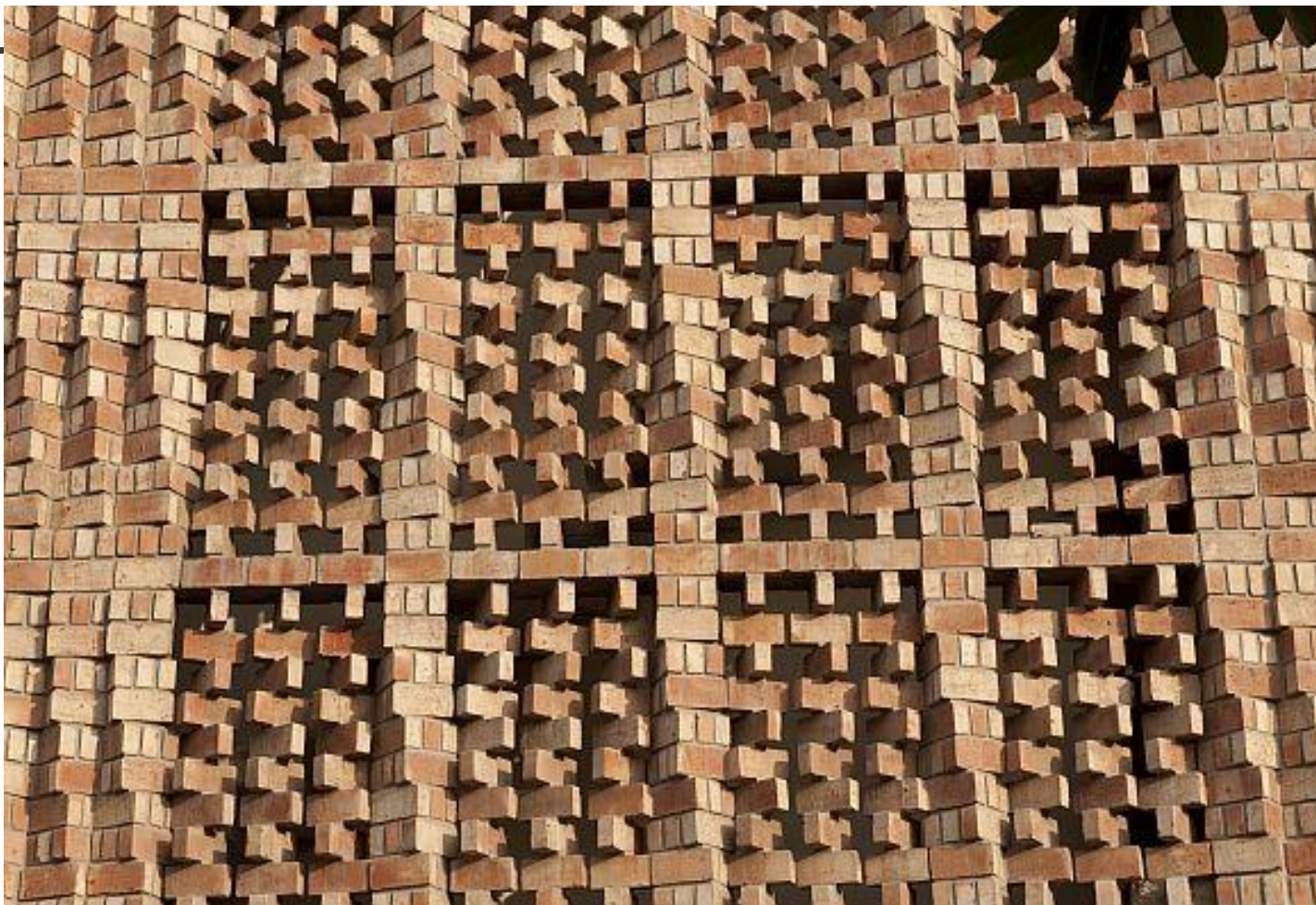


Kuće od opeke



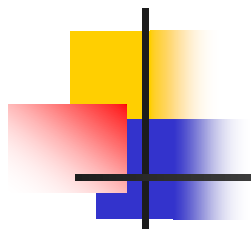
<http://brickmasonry.blogspot.com/>

Kuće od opeke



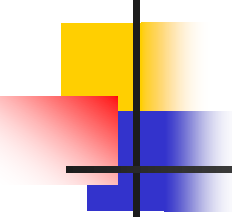
Dokumentacijski centar za ljudska prava južne Azije, Indija – Arhitekt: Anagram Architects

Obnavljanje znanja

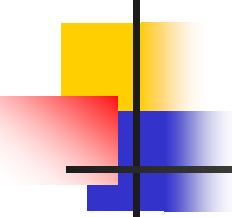


- Koje su dimenzije opeke NF?
- Od čega se izrađuje opeka NF i na koji način?
- Kakvi se zidovi mogu zidati ovom opekom?
- Koji materijal je potreban za zidanje?
- Koje vrste morta poznajete?
- Koja je razlika između cementnog i produženog morta?

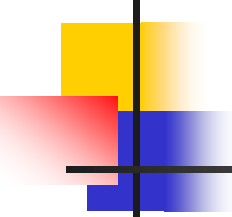
Obnavljanje znanja

- 
-
- Koji mort brže veže vapneni ili produženi?
 - Koje dijelove opeke NF koriste zidari za zidanje?
Recite samo nazive bez dimenzija.
 - Skicom prikaži dvije polovine opeke u cijeloj i kotiraj dijelove.
 - Skicom prikaži $\frac{1}{4}$ i $\frac{3}{4}$ opeke u cijeloj i kotiraj dijelove.
 - Skicom prikaži remenjak u cijeloj i kotiraj dijelove.

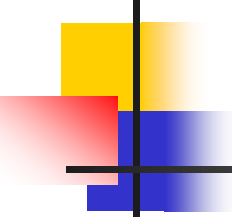
Obnavljanje znanja

- 
-
- Kojim pomagalima i na koji način zidari kontroliraju visinu zida koji zidaju?
 - Na koji način kontroliraju vodoravnost slojeva?
 - A na koji okomitost?
 - Što su ležajnice a što sudarnice?
 - Kako trebaju stajati sudarnice jedna u odnosu na drugu?
 - Koje su prosječne debljine sudarnice a koje ležajnice?
 - Mogu li parni i neparni sloj biti jednaki?

Obnavljanje znanja

- 
- Što je uzdužnjak?
 - Što je vežnjak?
 - Može li biti sloj nekog zida sastavljen samo od uzdužnjaka?
 - Može li biti sloj nekog zida sastavljen samo od vežnjaka?
 - Što je bolje, kod debelih zidova imati više vežnjaka ili uzdužnjaka? Zašto?
 - Na koji način se ože prekinuti zidanje zida od opeke NF?
 - Koje debljine može biti nosivi zid od opeke NF?
 - Koje debljine može biti nenosivi zid od opeke NF?

Obnavljanje znanja

- 
- Skiciraj parni i neparni sloj **početka** zida od opeke NF debljine pola opeke i dimensioniraj.
 - Skiciraj parni i neparni sloj **početka** zida od opeke NF debljine jedne opeke i dimensioniraj.
 - Skiciraj parni i neparni sloj **početka** zida od opeke NF debljine 1,5 opeke i dimensioniraj.
 - Skiciraj parni i neparni sloj **početka** zida od opeke NF debljine 2 opeke i dimensioniraj.

Obnavljanje znanja

- 
- Skiciraj parni i neparni sloj **ugla** dva zida od opeke NF debljine pola opeke i dimenzioniraj.
 - Skiciraj parni i neparni sloj **ugla** dva zida od opeke NF debljine jedne opeke i dimenzioniraj.
 - Skiciraj parni i neparni sloj **ugla** zidova od opeke NF debljine 1,5 opeke i dimenzioniraj.
 - Skiciraj parni i neparni sloj **ugla** zidova od opeke NF debljine 2 opeke i dimenzioniraj.
 - Skiciraj parni i neparni sloj **ugla** zidova od opeke NF debljine 2 i 1,5 opeke i dimenzioniraj.
 - Skiciraj parni i neparni sloj **ugla** zidova od opeke NF debljine 1 i 1,5 opeke i dimenzioniraj.

Obnavljanje znanja

- 
- Skiciraj parni i neparni sloj **sudara** dva zida od opeke NF debljine 12 i 25.
 - Skiciraj parni i neparni sloj **sudara** dva zida od opeke NF debljine po 25cm.
 - Skiciraj parni i neparni sloj **sudara** zidova od opeke NF debljine 25 i 38 opeke i dimensioniraj.
 - Skiciraj parni i neparni sloj **sudara** zidova od opeke NF debljine 38 i 38 opeke.
 - Skiciraj parni i neparni sloj **sudara** zidova od opeke NF debljine 38 i 51 opeke.