SASPARM 2.0

EUCENTRE European Centre for Training and Research in Earthquake Engineering

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Support Action for Strengthening PAlestine capabilities for seismic Risk Mitigation

SASPARM 2.0

2014 PROJECT FOR CIVIL PROTECTION FINANCIAL INSTRUMENT PREPAREDNESS AND PREVENTION SCHEME

RETROFIT MEASURES
PRACTITIONERS (UNDP Building Example)

Pavia – Nablus
May 25, 2016

ECHO/SUB/2014/694399 - SASPARM 2.0 Support Action for strengthening PAlestine capabilities for seismic Risk Mitigation
Project co-funded by ECHO - Humanitarian Aid and Civil Protection

UNDP Building in Jerusalem

- The UNDP building is composed of five floors; two basements, ground, first and second, of a total area equals to about 1,282m^2.

- The exterior walls are masonry which are composed of stone (70mm), plain concrete (230mm), insulation (50mm) and blocks (100mm) that form a wall of 450mm thickness in most regions.

- The structural floor heights are 3m for basements, 3.2m for ground floor and 2.8m for top floors. The slab thickness is 300mm one way and two way.

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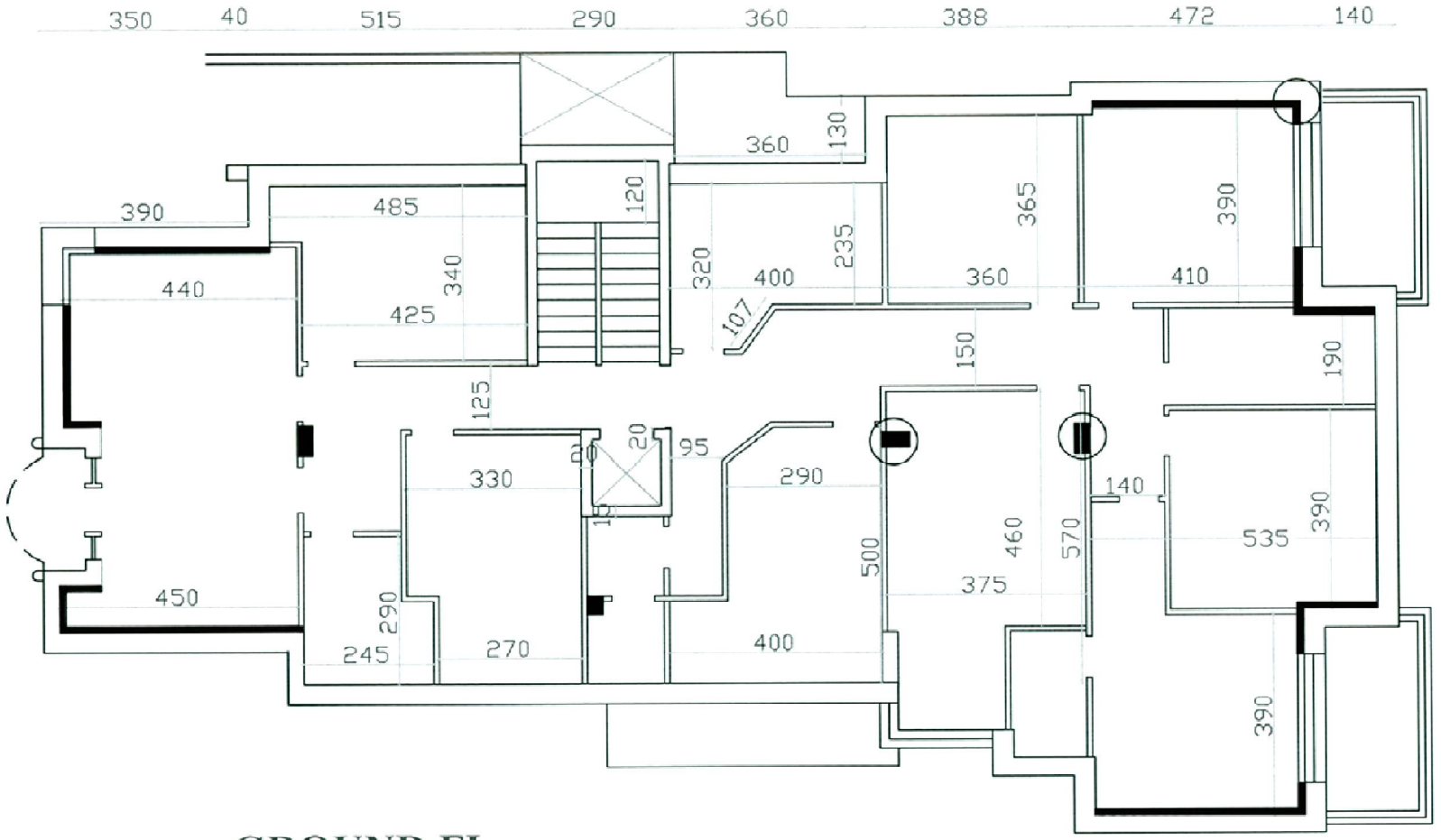

GROUND FL.

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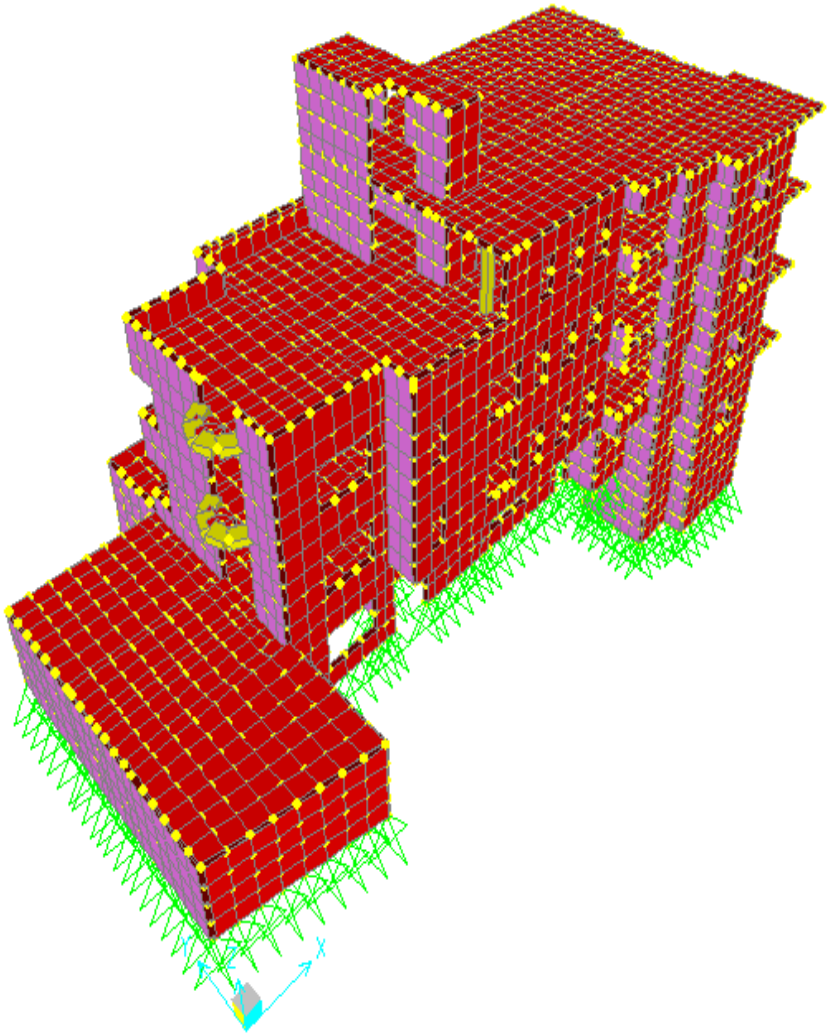
Three Dimensional Model

Three Dimensional Structural Model for the Building.



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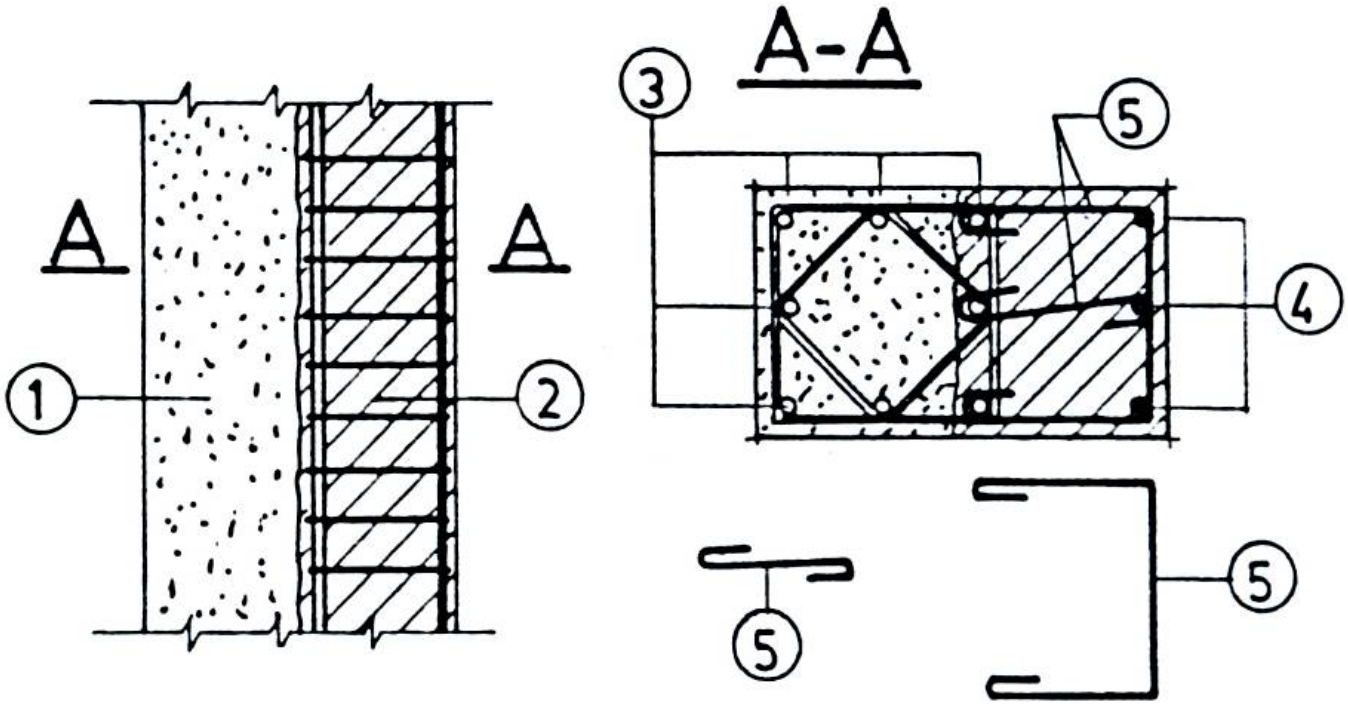
Load Cases for Elastic Static Analysis

1. Dead loads;
2. Superimposed dead loads;
3. Live load;
4. Seismic loads (PGA and RS from UBC97);
5. Soil loads;

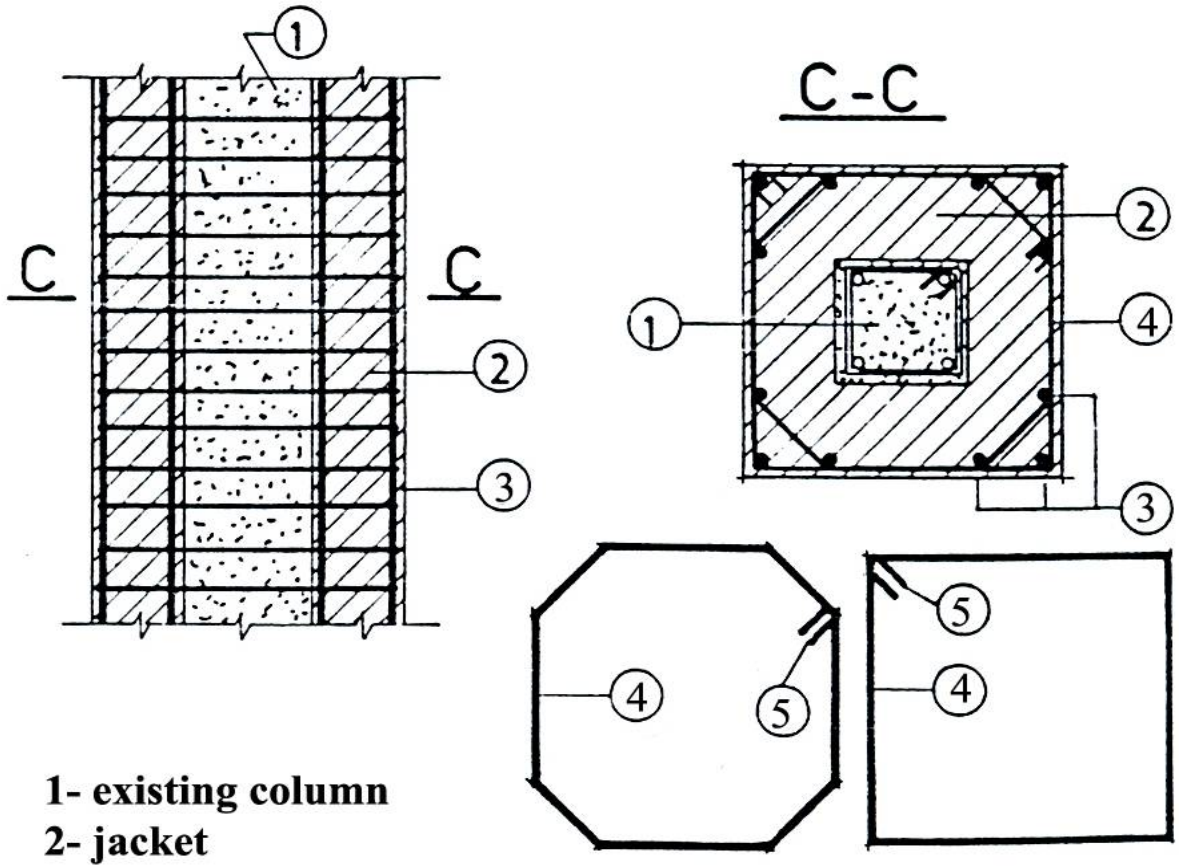
If possible, when evaluating existing buildings, in order to minimize conservative assumptions, inelastic and not elastic analysis should be used.

Table: Results of Non-destructive Tests

No.	Floor	Kg/cm²				Average	Used strength
1	Basement 2 FL.	395	400	-	-	398	300
1	Basement 1 FL.	387	372	-	-	380	
2	Ground Floor	347	387	392	376	375	
3	First Floor	394	382	405		393	
4	Second Floor	372	318	-	-	345	
5	Roof	365	-	-	-	365	

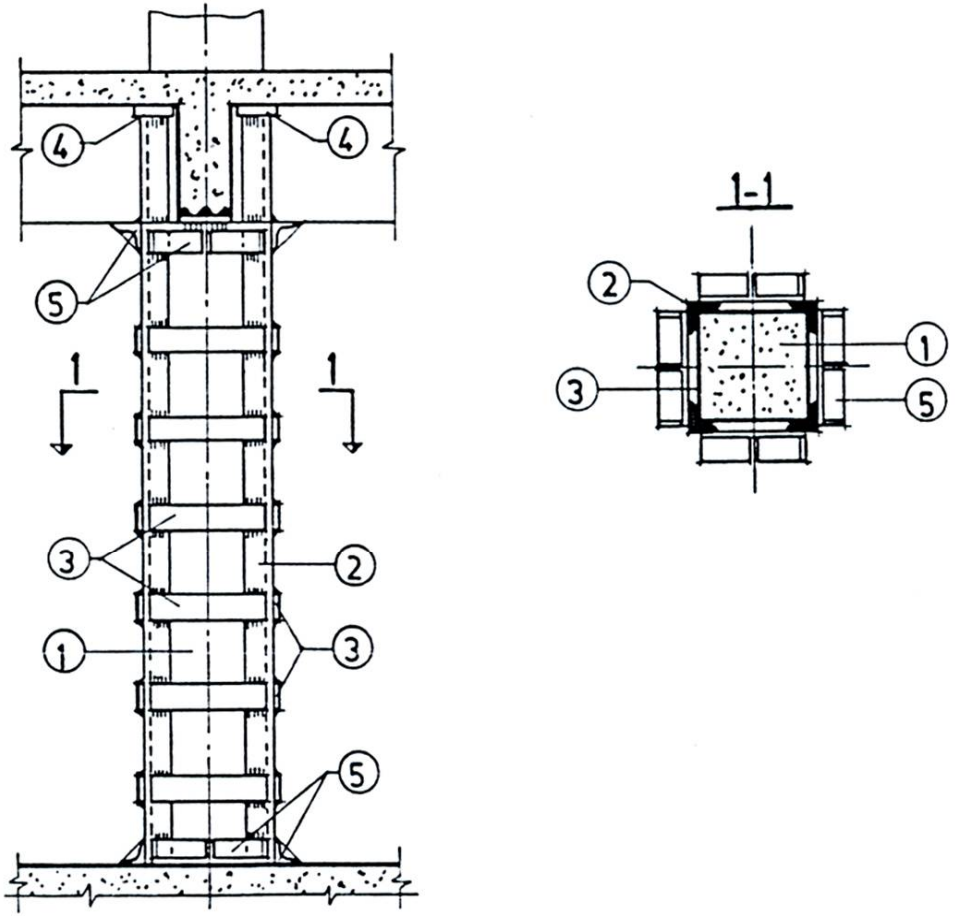


1- existing column; 2-jacket; 3- existing reinforcement
4-added longitudinal reinforcement; 5 added ties;



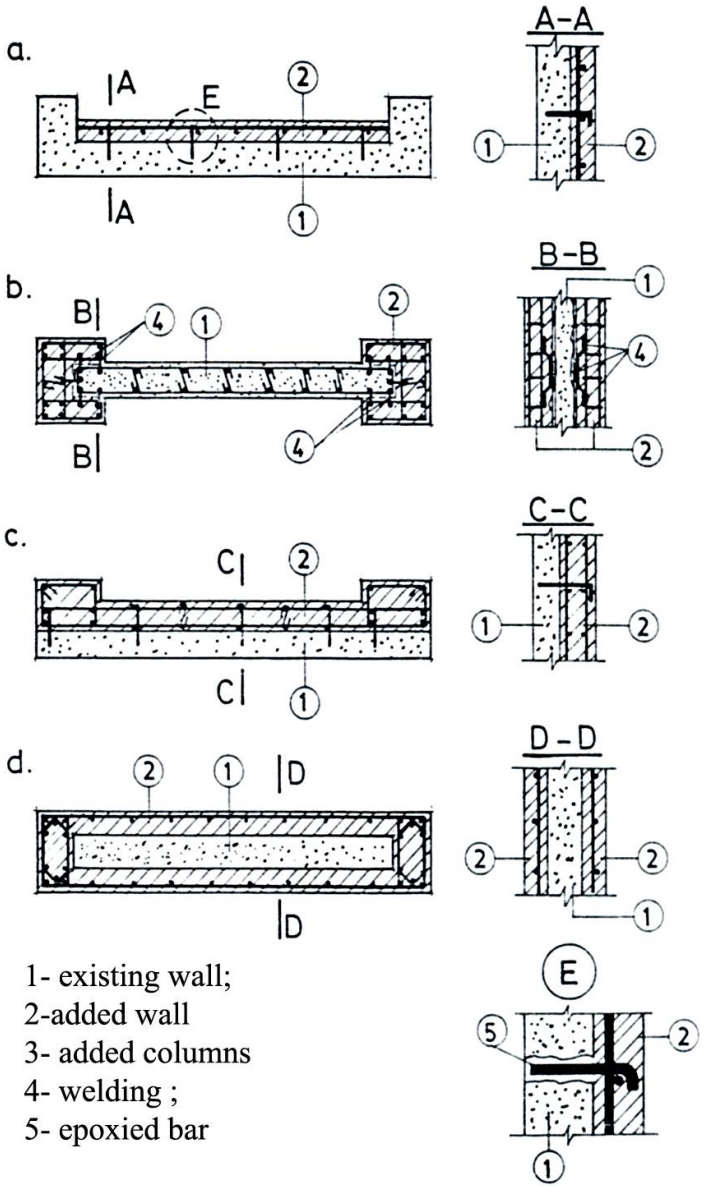
1- existing column
2- jacket
3- added longitudinal reinforcement
4- ties
5- alternative corners

Steel profile jacketing

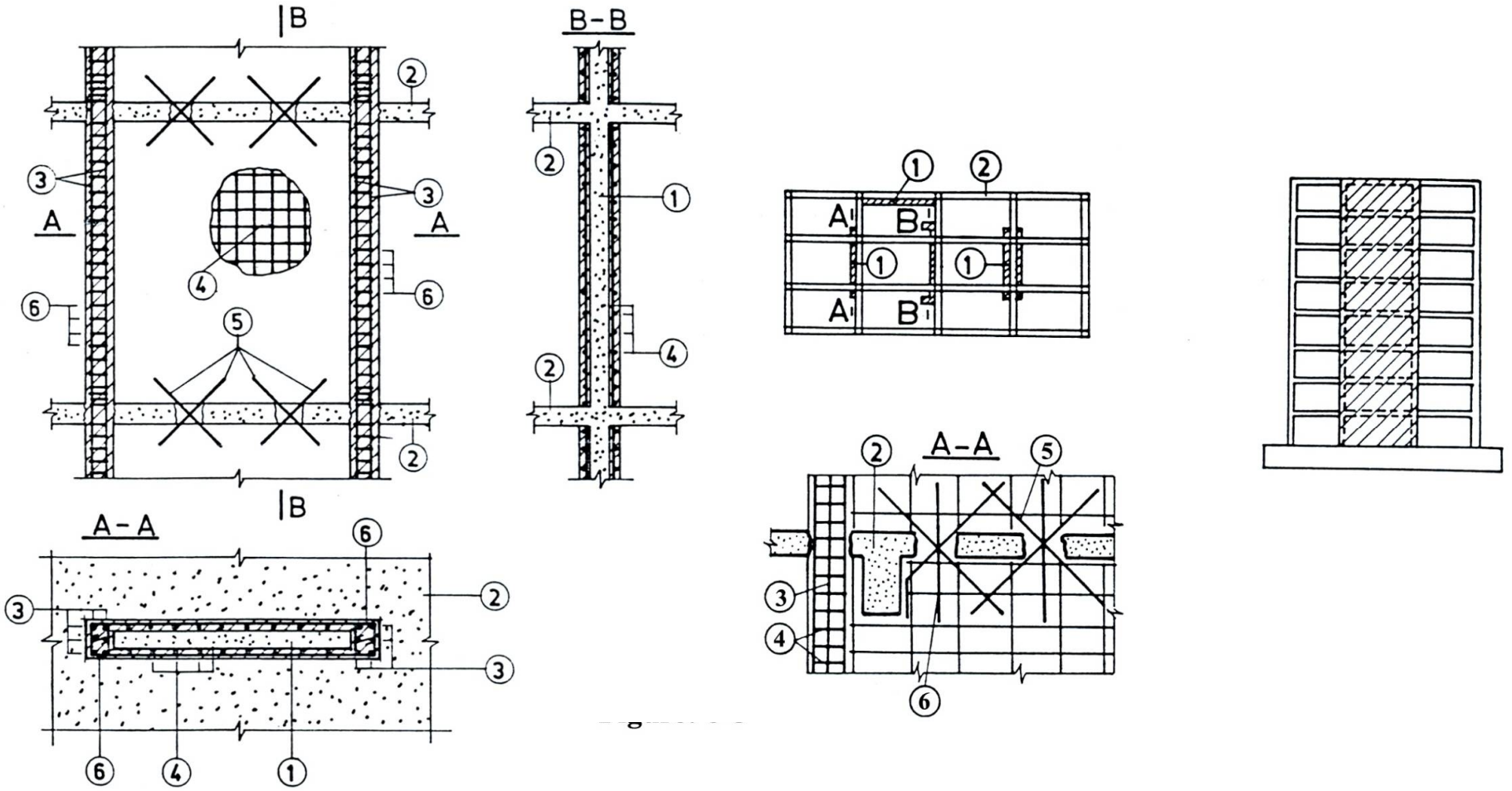


1- existing column; 2- steel angle profile; 3- steel plate ;
4- supporting plate; 5- angle profile.

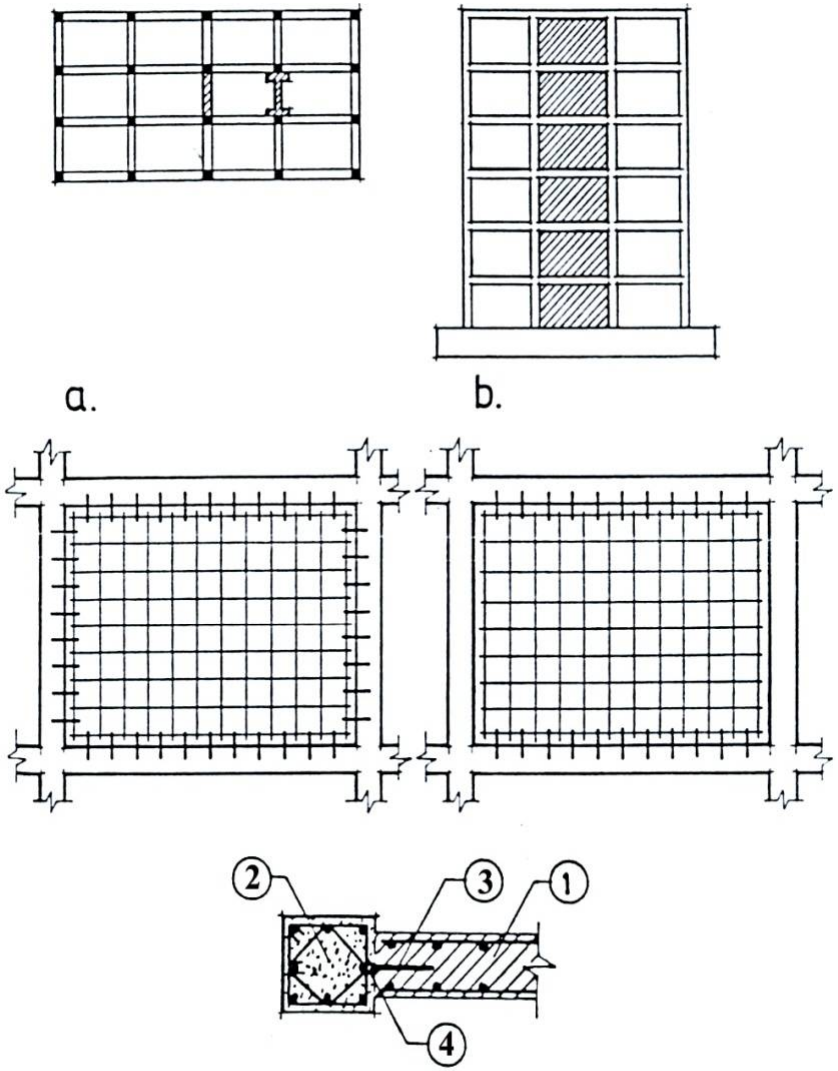
Increase of Wall Size



1- existing wall;
2-added wall
3- added columns
4- welding ;
5- epoxied bar

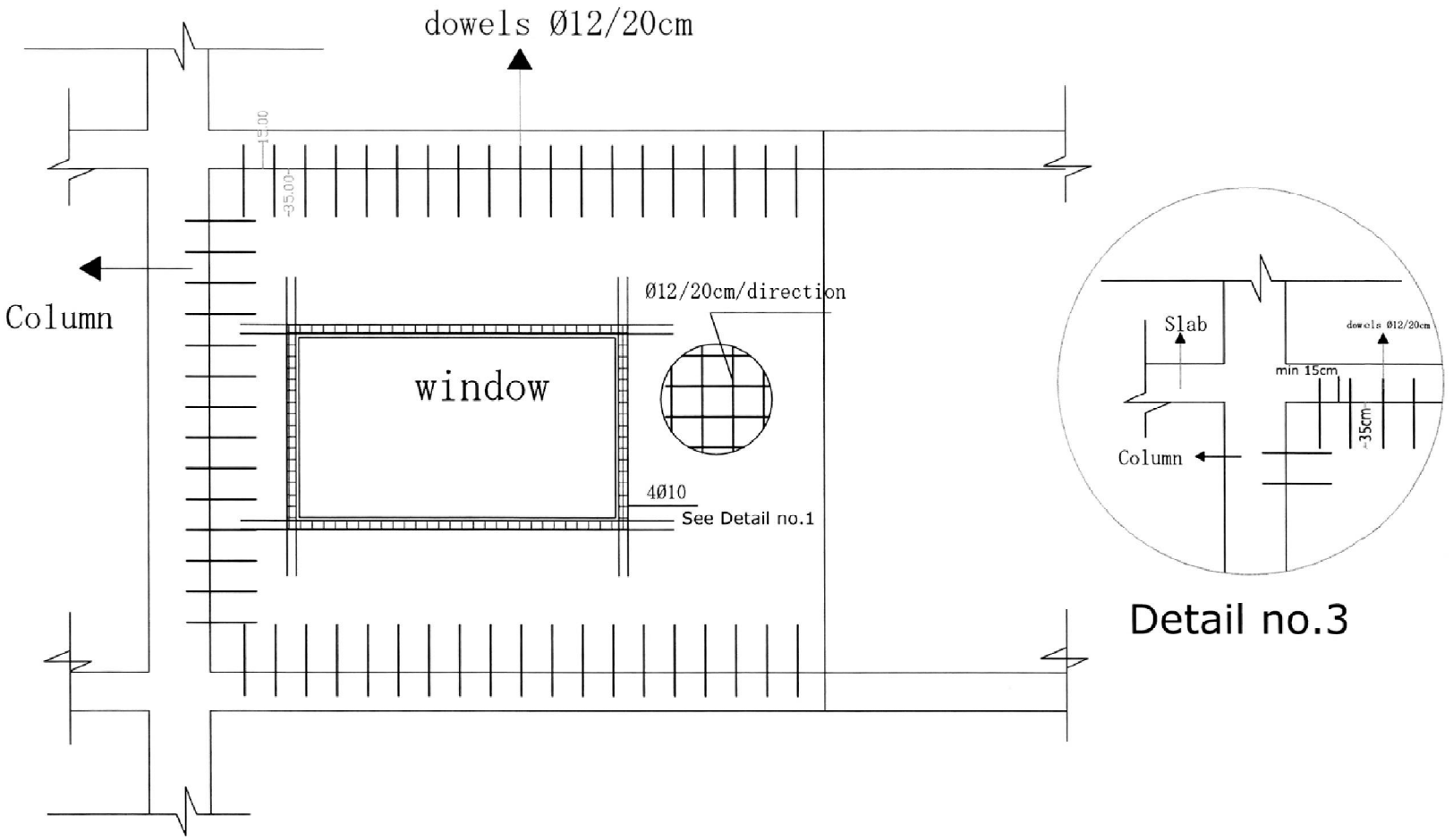


1- existing wall; 2- existing slab; 3- added longitudinal reinforcement existing column; 4- added wire fabric; 5- diagonal connecting



1- added infilled wall; 2- existing column;
3- welded anchor bar; 4- welding.

a- cast-in- place infilled shear wall
b- cast- in- place infilled shear wall separated from columns



Retrofiting System through adding Reinforced Concrete Jacketing Walls

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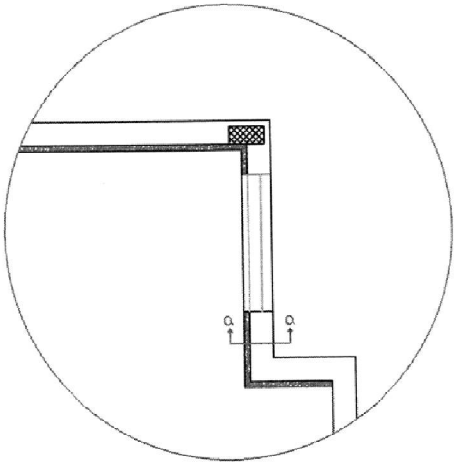

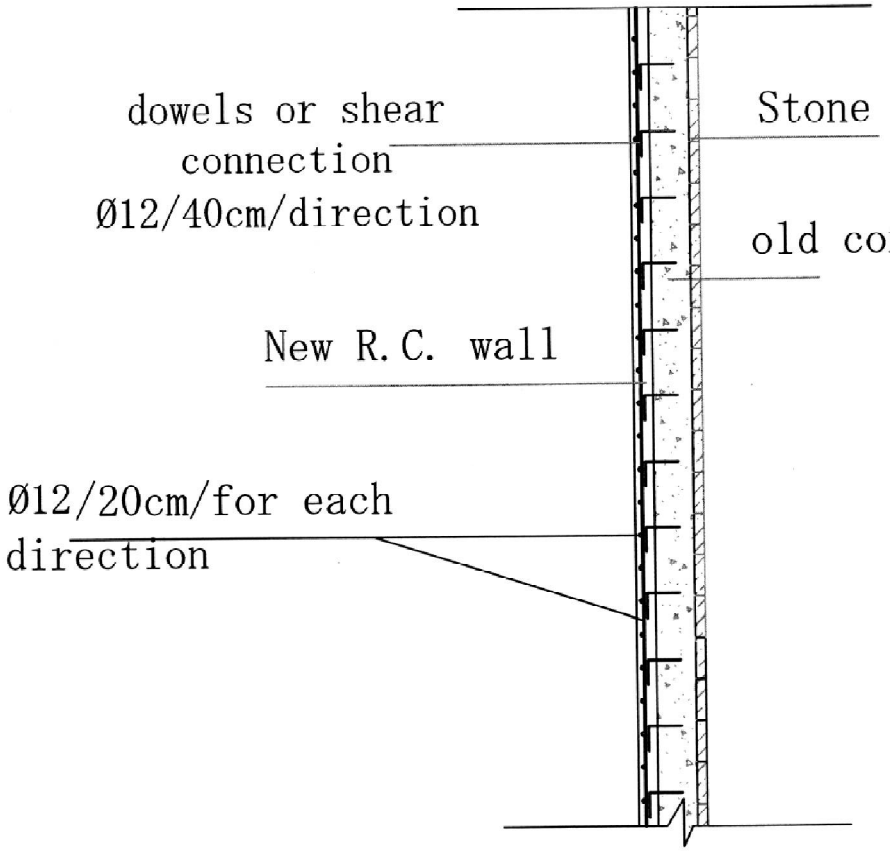

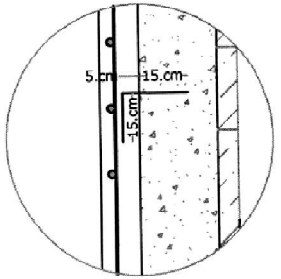

Detail no.2

Section a-a: Details of old concrete wall and proposed R.C wall

Mitigation
Protection

The more advanced rehabilitation techniques follow…