

EARTHQUAKE RECONSTRUCTION AND REHABILITATION PROJECT CHECK LIST FOR DESIGN EVALUATION

CODES & REFERENCES: ACI 318-02, BUILDING CODE OF PAKISTAN-2007, AISC 2005

Sr. No	SUBMISSION	YES	NO	REMARKS
MISSING DOCUMENTS				
1	SIGNED COVERING LETTER FROM SPONSOR/OWNER			
2	REGISTRATION CERTIFICATE OF DESIGNER/CONSULTING ENGINEER WITH LIC. NO			
3	NOC/PLEDGE LETTER ISSUED BY ERRA			
	a. Permission letter from ERRA in case of double storey primary school			
SITE DESCRIPTION REPORT INCLUDING:				
4	a. Site location & UTM coordinates			
	b. Presence of slopes and ridges			
	c. Site photographs			
	d. No of class rooms previously provided & no class rooms proposed			
	e. No of students			
5	SOIL INVESTIGATION REPORT			
DESIGN REPORT INCLUDING:				
6	a. Codes & Standards			
	b. Material strength & properties			
	c. Backup calculations used for input data			
DRAWINGS				
7	THREE SETS OF DRAWINGS DULY SIGNED BY OWNER AND DESIGNER			
SITE PLAN :				
8	a. Detailed geological survey and contours			
	b. Location of boundary wall			
	c. Location of Existing (if any) & proposed building on site plan			
ARCHITECTURAL DRAWINGS:				
9	a. Provision of grills on windows			
	b. Provision of ramps and european type W.C for physically challenged individuals			
	c. Provision of two doors for large rooms & all doors opening outside			
	d. Provision of shades on windows			
	e. Detailed plans, elevations and sections of building			
10	STRUCTURAL DRAWINGS:			
	i. COMPREHENSIVE GENERAL NOTES			
FOOTINGS:				
	a. Foundation plan			
	b. Minimum thickness of footings provided is 9 "			
	c. Depth of footing from NSL provided corresponds to the requirement laid down in soil investigation report			
	ii. d. Negative reinforcement provided in case of combined footings			
	e. Minimum reinforcement in footings as per ACI 7.12.2.1			
	f. Column transverse Reinforcement terminating 12 " into footings as per ACI 21.4.4.5			
	g. 90° hooks of column bars into footing with bars oriented towards center of column for fixed end condition ACI 21.10.2.2			
	h. Area of footing provided is adequate			

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	COLUMNS:			
	a. Shortest cross sectional dimension ≥ 12 " ACI 21.4.1			
	b. Minimum & maximum reinforcement ratio satisfy ACI 21.4.3.1			
	c. Lap splices within centre half of column ACI 21.4.3.2			
	d. Transverse reinforcement enclosing lapsplice confirms to ACI 21.4.4.2			
iii.	e. Lap length provided comply with ACI 21.2.7			
	f. Transverse reinforcement throughtout length of column satisfying ACI 21.4.4.4			
	g. Cross ties provided to unattended bars in column as per ACI 21.4.4.3 & 7.10.5.3			
	h. Ties shall have a 135° hook at ends with 6db or 3 " extension whichever is greater as per ACI 7.10.5.3			
	i. Reinforcement provided is as required in design			
	BEAMS:			
	a. Width to depth ratio ≥ 0.3 , Width ≥ 10 " as per ACI 21.3.1			
	b. Minimum reinforcement at every section is not less that given in ACI 21.3.2.1			
iv.	c. Lap splices are not used within joints & within 2h from column face ACI 21.3.2.3			
	d. Hoop spacing in lap splices is not exceeding d/4 or 4 " as per ACI 21.3.2.3			
	e. Maximum spacing of the hoop at every section is as per ACI 21.3.3.2			
	f. Reinforcement provided is as required in design			
	BEAM-COLUMN JOINTS:			
v.	a. Column dimension parallel to beam reinforcement is $\geq 20db$ and vise versa ACI 21.5.1.4			
	b. Beam reinforcement is anchored in tension & compression into column far face as per ACI 21.5.1.3			
	BRICK WALLS:			
vi.	a. 1#4 vertical bar is provided at both sides of openings.			
	b. 2#3 bars are provided after every 8th course			
	c. If blocks are used than size is not less than 8 " for main walls & 6 " for partition walls			
	d. Wall footing is provided for partition walls.			
vii.	WALL COLUMN JOINT:			
	a. 2#3 bars with a 2' lap is provided at both faces of the wall column joint.			
	SLABS:			
viii.	a. Minimum thickness of one way & two way slabs as per ACI 9.5.2.1&9.5.3 respectively			
	b. Minimum reinforcement in slabs as per ACI 7.12.2.1			
	TRUSSES:			
ix.	a. Structural steel confirming to A-36			
	b. All high strength connection bolts confirming to A325 & all others confirm to A307			
	c. Welding is done in accordance with AWS structural welding code D1-11			
	d. Elevations of all trusses as shown in truss layout plan is given			
	e. Sizes of gusset plates for all the connections is given			
X.	DESIGN/DRAWING OF STAIRCASE IS GIVEN			
xi.	DESIGN/DRAWINGS OF BOUNDARY WALL IS GIVEN.			
xii.	DESIGN & DRAWING OF RETAINING WALL IS GIVEN			

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	PLUMBING DRAWINGS:			
11	a. Drainage of roof through rainwater pipe is done within the site			
	b. Linkage of sewerage pipes to the main line OR provision of soakage pit/septic tank & disposal within the site			
	c. Detail drawings of overhead/under ground water tanks			
	d. Drawings of septic tank is given.			
	ELECTRICAL DRAWINGS:			
12	a. Detailed drawings of electrification with specifications of materials used			
	b. Legend for the symbols used in the drawings			
	c. Lightning Layout Plan is given			
13	PREFEBRICATED STRUCTURES:			
	LITERATURE FROM SUPPLIER COVERING:			
i.	a. Technical and commercial aspects			
	b. Performance characteristics of joints and connections			
	c. Period since this structural system has been in use			
	d. Precedents of the use of this structural system in other seismic areas of the World			
	e. Details of attachments of non structural elements with structural system.			
	DAMP PROOF COURSE USED:			
ii.	a. Specifications of Material used			
	b. Suitability with particular structural system			
iii.	WATER PROOFING PROVIDED			
iv.	ADMIXTURES USED:			
	COMPUTER MODEL			
14	SOFTWARE USED: SAP, STAAD, ETABS			
15	3-D COMPUTER MODEL			
16	SEISMIC ANALYSIS & CORRECT SEISMIC PARAMETERS AS PER BCP 5.29			
17	TRUSS MODEL IS PROVIDED			
	LOADS APPLIED ON THE STRUCTURE ARE CORRECT			
18	a. Seismic loads			
	b. Dead loads as per BCP section 5.6			
	c. Live loads as per BCP section 5.7			
	d. Snow loads as per BCP section 5.8			
	e. Wind Loads as per BCP section 5.9			
19	LOAD CASES DEFINED ACCORDING TO PAKISTAN BUILDING CODE SECTION 5.12			
20	SECTION PROPERTIES OF MEMBERS ARE SAME IN MODEL AND DRAWINGS			
	ALL MEMBERS PASSING UNDER GIVEN LOAD			
21	a. Column			
	b. Beams			
	c. Truss members			
22	REACTIONS FROM TRUSSES ARE APPLIED ON MAIN MODEL			
23	DESIGN OF FOOTINGS IS GIVEN			