Central High School Fireproofing of 1909 Concrete Slab at Central High School 5/29/2025

Alex,

My understanding is that we are looking to see if we need to replace the fireproofing that has fallen from the underside of the original building slab in the 1909 portion of the building above the Administration area.

Pages 2 and 3 show the most recent code summary that we have for the building, from 2017.

The Construction Type is 1B Floor / Ceiling Assembly is 2 hours Also, note that the building is fully sprinklered

Page 3 also has a plan diagram showing the location of the current problem.

Page 4 shows the floor thickness and reinforcement for the 1909 slab above this area – it's either 8" or 9" thick. Probably 9", as I think this is a longer span floor slab. But we can assume 8" as a more conservative assumption.

Page 5 shows the required thickness for a reinforced concrete slab to meet a 2-hour fire-resistance rating for different concrete types. It varies from 3.6" to 5".

I looked around to see what type of concrete may have been used in a 1909 reinforced slab, but am not sure – most likely I'd say it's not the lightweight options.

Given that the maximum slab thickness for 2-hour fire-resistance in Table 722.2.2.1 Minimum Slab Thickness (page 5) is 5", and we can assume given the construction drawings and specifications for the 1909 building (page 4) has a minimum of an 8" reinforced concrete slab – the existing 1909, 8" reinforced concrete slab, is adequate to satisfy the 2-hour fire resistance for the floor / ceiling assembly, without fireproofing.

Let me know how this works, or if you need further clarifications or explanations.

Best, Darryl Pratte

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Code Summary info from 2017



CODE SUMMARY

CODE SUMMARY	Revised 12-12-2016		
PROJECT DESCRIPTION			
FIRE ALARM SYSTEM AND MECHANICAL DAMPER UPGRAD	DES		
		_	
GENERAL TYPE OF PROJECT	YES	NO	
NEW BOILDING	-	•	
ADDITION	-	٠	
REMODEL	•		
		e	
AUTHORITIES HAVING SORISDICTION & APPERABLE REGU	YES	NO	
CITY OF ST PAUL, MN	•		
STATE OF MINNESOTA			
2012 IBC (plus amendments) 1307-2015 Minnesota State Elevator Code ASME A17.1-2010, ASME A17.3-2011, ASME A17.4-1999, ASME A17.1-2010, ASME A17.3-2011, ASME A10.1-2009, ASME B20.1-2009 1311-2015 Conservation Code for Existing Buildings 2012-IEEC (plus amendments) 1315-2014 National Electrical Code 1323-2015 Minnesota Concessibility Code 2012 IBC (chapter 11) 2009 ICC/NSI A117.1 (plus amendments) 1346-2015 Minnesota Mechanical Code and Fuel Gas Codes 2012 IBC (chapter 11) 2009 ICC/NSI A117.1 (plus amendments) 1346-2015 Minnesota State Plumbing Code 2012 Uniform Plumbing Code (plus Amendments) 2012 ICC (plus amendments)			
DEPARTMENT OF HEALTH (DOH)	-	٠	
2010 FGI Guidelines		•	
THE JOINT COMMISSION (TJC)		•	
CENTER FOR MEDICARE/MEDICAID SERVICES (CMS)		٠	
Applicable NFPA Standards for TJC or CMS accreditation: NFPA 101-2012, NFPA 99-2012, NFPA 10-2010, NFPA 13-2010, NFPA 25-2011, NFPA 45-2011, NFPA 70-2011, NFPA 72-2010, NFPA 80-2010, NFPA 82-2009, NFPA 90A-2012, NFPA 90B-2012, NFPA 96-2011, NFPA 110-2010, NFPA 117-2010			

OTHER APPLICABLE	REGULATI	ONS			YES	NO
ADAAG						Г
MN STATE RULES						٠
OCCUPANCY CLASS	SIFICATION	(S)		_		
OCCUPANCIES	(IBC CH (LSC C	H 3 & 4) H 12-42)	E &	A	YES	NO
CHANGE OF OCCUPANCY? (If Remodeling)				•		
SEPARATED OCCUPANCIES? (IBC Section 508)				•		
FIRE BARRIER RATING(S) (Section 707) SEE COD			E PLA	NS		
TYPE(S) OF CONSTR CONSTRUCTION TY	PE(S)	(IBC (Cha	pter 6)	1-1 27 111	<mark>8 &</mark>
TYPE(S) OF CONSTR CONSTRUCTION TY AREA SEPARATION	PE(S)	uls.	IBC (Cha LSC (Chi SE	pter 6) ipter ?? E COD	1-1 ??) ///	8 de 8
TYPE(S) OF CONSTRUCTION TY AREA SEPARATION ALLOWABLE AREA	PE(S) S / FIRE WA	ALLS R (Sector	IBC (Cha LSC (Chi SE SM)	pter 6) apter ?? E COD	1-1 ??) /// ie pla	8 de 8 NS
TYPE(S) OF CONSTR CONSTRUCTION TY AREA SEPARATION ALLOWABLE AREA BASIC ALLOWABLE A	RUCTION PE(S) S / FIRE WA PER FLOOI	ALLS R (Sector able 500)	IBC (Cha LSC (Cha SE SM)	pter 6) ipter ?? E COD	I-I ??) III E PLA	8 de 8 NS
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TOTAL ALLOWABLE AREA/FLOOR

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	BATHO-HERI	18.87	
STRUCTURAL FRAME		1	
COLUMNS	2	EXG	
GIRDERS	2	EXG	
TRUSSES	2	EXG	
BEARING WALLS		-	
EXTERIOR BEARING WALLS	N/A	EXG	
INTERIOR BEARING WALLS	N/A	EXG	
NON-BEARING WALLS AND PARTITIONS	(BC Table 512 are	c Sector (02.4.1)	
EXTERIOR	0	EXG	
INTERIOR	ee Code Plans, RC	Plans, & Spec	
FLOOR CONSTRUCTION			
FLOOR/CEILING ASSEMBLY	2	EXG	
PRIME & SEC. FLOOR BEAMS, JOISTS	2	EXG	
ROOF CONSTRUCTION			
ROOF/CEILING ASSEMBLY	1	EXG	
PRIME & SEC. ROOF BEAMS, JOISTS	1	EXG	
OTHER			
SHAFTS AND EXIT PASSAGEWAYS	SEE CODE PLA	IN EXG	
EXTERIOR DOORS AND WINDOWS		EXG	
MISCELLANEOUS		YES NO	
FIRE RESISTIVE CORRIDORS?	(BC Table 1018	• •	
SMOKE TIGHT CORRIDORS (SMOKE PAR	TITIONS} (BC 407.	5 •	

Code Summary info from 2017 and location plan

ADDITIONAL NOTES

LEVEL ONE HAS EXIT DISCHARGE FROM EXIT STAIR ENCLOSURES. THIS ARRANGEMENT IS FROM ORIGINAL DESIGN IN 1977. CORRIDOR RESEMBLES AND HAS CONSTRUCTION SIMILAR TO EXIT PASSAGEWAYS WITH RATED WALLS, DOOR, AND DAMPERS.

PROJECTS THAT AFFECT WALLS, DOORS, AND DAMPERS SHOULD VERIFY AND UPGRADE AS REQUIRED TO MEET SHOWN REQ'S.

BUILDING HAS HAD NUMEROUS REMODELINGS AND ADDITIONS. PARTS OF BUILDING WAS CONSTRUCTED IN 1920S AND 1950S. A MAJOR REMODELING AND ADDITION IN 1977 UPGRADED THE STRUCTURE. THE PROJECT INCLUDED UPGRADES TO FIRE PROOFING, ETC.

BUILDING WAS CLASSIFIED PER 1973 UBC AS TYPE I (TYPE IA PER 2012 IBC) AND TYPE IV (TYPE II-B PER 2012 IBC). CONSTRUCTION TYPE IS BEING DOWNGRADED TO I-B AS IT ALLOWS 6 STORIES (W/SPRINKLER) AND EXG BUILDING HAS 4 STORIES WITH A PENTHOUSE AND BASEMENT.

LOWERING CONSTRUCTION TYPE ALLOWS FOR FUTURE WORK TO PROVIDE 2 HOUR COLUMNS AND BEAMS RATHER THAN 3 HOUR AS WELL AS 1 HOUR ROOF STRUCTURE INSTEAD OF 1-1/2 HOUR WHILE STILL ALLOWING UNLIMITED AREA.

II-B PORTIONS OF THE EXISTING STRUCTURE MUST MEET APPLICABLE AREA AND HEIGHT REQUIREMENTS IF ADDITIONAL SQUARE FOOTAGE IS ADDED.



Construction drawing for 1909 original building



Slab reinforcement and thickness for 1909 original building

- JLAB REINFORCEMEN.

REINFORCEMENT OF CARRIDOR FLOOR VIABN TO BE ONE WAY NYSTEM - REINFORCING BARS TO RUN AT RIGHT ANGLEN TO BEANN ACRONN CORRIDOR

FOR ALL SPANS 16 FT OR LESS UNE & "BARS 42".O.C. CROSS BARS OF TEMPERATURE BARS ABOUT 18".O.C. DEPENDENT UPON WIDTH OF CORRIDOR - ROUGH SLAB TO BE T"THICH. FOR ALL PANELS WHERE MARKED 2W ON PLANS USE E WAY STSTEM TO CORRESPOND WITH BALANCE OF FLOOR SLABS.

JNALL UNIT FLOOR SLADS OR THOSE ABOUT 25 X28 SHALL HAVE A TOTAL ROUGH THICKNESS OF P REINFORCEMENT SHORT WAY OF SLAD 2" BARS 4"0.0. REINFORCEMENT LONG WAY OF SLAD 2" BARS 5"0.0. LARGE UNIT FLOOR SLADS OR THOSE ABOUT 25 X33 SHALL HAVE TOTAL ROVOH THICKNESS OF 9" REINFORCEMENT SHORT WAY OF SLAD 3, BORS - 34"0.0. REINFORCEMENT LONG WAY OF SLAD 2, BARS 72"0.0.

ASSEMBLY ROOM AND AUDITORIUM FLOOR SLABS BE 6" THICK IN THE ROUGH JARS AND TO BE REINFORCED BY 2"BARS 51" O.C. PARALLEL WITH LARGE GIRDER BEAMS - TEMPERATE SERV 3 -18 0.C. REINFORCMENT FOR ROOF SLADS TO BE AV FOLLOWS - OVER ASSEMBLY POOM ROUGH SLAB TO BE 4" THICK & BARS 63 DE PARALLEL WITH TRYSSES AND TEMPERATURE BARN IF O.C. OPER LARGE PANELS 25 x 32' ROUGH SSAB TS THICK SBARS 4"O.C. SHORT WAY OF SLAB SRAN SBARS 6 O.C. LONG WAY OF SPAN. OVER SMALL PANELS 25 x 28 ROVOH SLAB 65 THICK STRAKES A- AMAN WAY OF SLAS SPAN. 2" PARSE 52" S.C LONG WAT OF SPAN OVER CORRIDOR ROUGH SLAS 6" THIGK "BARS 5" A.C CONCRETE MINFURE THROUGHOUT TO BE TPART CAMENT 12" PART SAND SPARTS ROCK TO PASS THRO. TRING

ICC Fire-Resistance Rating for Reinforced Concrete Floor Slabs



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722.2.2Concrete floor and roof slabs.

Reinforced and prestressed floors and roofs shall comply with Section 722.2.2.1. Multicourse floors and roofs shall comply with Sections 722.2.2.2 and 722.2.2.3, respectively.

722.2.2.1Reinforced and prestressed floors and roofs.

The minimum thicknesses of reinforced and prestressed concrete floor or roof slabs for fire-resistance ratings of 1 hour to 4 hours are shown in Table 722.2.2.1.

Exception: Minimum thickness shall not be required for floors and ramps within parking garages constructed in accordance with Sections 406.5 and 406.6.

TABLE 722.2.2.1 MINIMUM SLAB THICKNESS (inches)

		FIRE-RESISTANCE RATING (hours)				
CONCRETE TYPE	1	1 ¹ /2	2	3	4	
Siliceous	3.5	4.3	5	6.2	7	
Carbonate	3.2	4	4.6	5.7	6.6	
Sand-lightweight	2.7	3.3	3.8	4.6	5.4	
Lightweight	2.5	3.1	3.6	4.4	5.1	

For SI: 1 inch = 25.4 mm.