OYSTER CREEK NUCLEAR STATION

REEVALUATION OF SAFETY-RELATED
CONCRETE MASONRY WALLS
NRC IE BULLETIN 80-11

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ABSTRACT

The purpose of this reevaluation is to determine the structural adequacy of the concrete masonry walls as required by the NRC IE Bulletin 80-11.

The analysis was performed using the ANSYS Computer Program to determine the frequency and resultant stresses in the block walls.

The results of the stress analysis indicate that all walls are qualified, except four walls to be analyzed later and the walls preempted by modifications.

The recommended boundary and additional supports must be provided.

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1.0 INTRODUCTION

The purpose of the reevaluation is to determine the structural adequacy of the concrete masonry walls as required by the NRC IE Bulletin 80-11.

The reevaluation shall determine whether the walls will perform their intended function under all postulated loads and load combinations specified in the "Criteria for the Reevaluation of Concrete Masonry Walls", Enclosure 2 to Reference 11 which is consistent with the requirements outlined in item 2b of the Bulletin.

2.0 STATUS OF REANALYSIS AND MODIFICATION

- In the initial report (Reference 10) 47 walls have been identified as safety related walls to be reanalyzed. Thereafter, Wall No. 36 has been incorporated in Wall No. 42. Consequently, there are 46 safety related walls (See Appednix 1).

  General arrangement and configuration of these walls is shown in Enclosures 4 and 5 to Reference 11.

- It was determined that minor preemptive modifications to 20 selected walls would remove the potential missile hazard to the vital systems and would preclude further reanalysis. The walls included in this group are wall numbers: 1, 3, 4, 9, 10, 11, 12, 13, 14, 16, 34, 35, 37, 38, 39, 40, 41, 42, 46 and 47.

- Wall No. 2 inside the Control Room has been removed from the scope of the stress analysis due to the difficulty of providing the needed supports. A net type vertical unistrut barrier was provided to insure that the wall can not fall onto the control panels (Reference 5).

- Wall No. 21 has been covered by consequence failure analysis and excluded from stress analysis. The failure of Wall No. 21 will not jeopardize the plant from a safe shutdown (Ref. 13). This wall will be completely removed during the next refueling outage (Cycle 11).

- Wall No's. 31, 32, 33, and 45 which are covered by the consequence failure analysis will be reanalyzed in the future as a combination model. The failure of these walls will not jeopardize the plant from a safe shut down (Ref. 13).

- The remaining Wall Numbers 5, 6, 7, 8, 15, 17, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 43 and 44 have been stress analyzed. Among the twenty walls, six of them (5, 6, 7, 25, 26, 27) do not need modification. Twelve of them (8, 15, 17, 18, 19, 20, 24, 28, 29, 30, 43, 44) will be modified during the cycle 11 refueling outage. These walls are also consequence - analyzed and the failure of them will not endanger the plant from a safe shut down. (Ref 13.). The deferment of modification of these walls have been approved by the NRC (Ref. 14).

Two walls (22, 23) will be modified during the present cycle 10 refueling outage.

3.0 METHODS

The analysis was performed using the ANSYS Computer Program to determine the frequency and resultant stresses in the block walls. None of the walls were intended to resist impact or pressurization load, nor would they be subjected to a significant thermal load to be of any concern.

In accordance with Ref. 7, the zero period acceleration (ZPA) of the site specific spectra (SSS) for Oyster Creek plant is 0.165g SSE. The NUREG-53018 floor response curves (Ref. 6) are based on 0.22g of the ZPA of SSS. Therefore, the seismic evaluation was performed using 75 percent of the values resulting from the response spectra in Reference 6.

In the analysis, all support edges of the block walls were assumed to be simple. In reviewing the wall support details shown in the construction drawings it was determined that some supports are inadequate to transfer the Seismic Shear Load to the main structure. In order to be consistent with the analysis, some wall support edges, shown in Appendix 2, will have to be reinforced to be able to carry the Seismic Shear Load. For a number of walls shown in Appendix 2, additional intermediate supports must be provided to reflect the assumptions of the analysis. For the taller walls around the Reactor Building staircase (Wall No's. 29 & 30, and future analysis of walls 31, 32, 33 & 45) advantage must be taken of the combining action from each adjacent wall, in order to qualify them for undertaking the drift effect and the acceleration force in two horizontal and vertical directions.

4.0 RESULTS

The results of the block wall analysis are summarized in Appendix 3 as listed below:

1. Stresses: See pages 3-1 to 3-27.

2. Out-of-plane and in plane shear: See pages 3-28 and 3-29.

3. In-plane strain. See pages 3-30 & 3-31.

5.0 CONCLUSIONS

The results of the stress analysis indicate that all analyzed walls are qualified by satisfying the stress acceptance criteria using either uncracked or cracked section model. In the analysis, it was assumed that:

1. The support edges of all walls are capable of transferring the Seismic Shear Load to the main structure.

2. Additional intermediate supports and bracings are provided where necessary.

3. The excess equipment loads on the block walls are either removed or transferred to another support point, other than the block wall, so that, the wall can be qualified.

4. Both surfaces of the block walls have no visible cracks.

6.0 RECOMMENDATIONS

The modifications listed below are to be implemented in order for the block walls to be consistent with the assumptions in the analysis.

1. Reinforce the support edges of the walls shown in the table in Appendix 2.

2. Provide intermediate supports and bracings as shown in the table in Appendix 2.

3. Remove the excess equipment load from the wall No's. 33 and 43.

4. Repair all visible cracks on both sides of the concrete block walls.

7.0 REFERENCES

1. ACI 531-79 "Building Code Requirements for Concrete Masonry Structures".

2. Burns & Roe, Inc., Technical Specification No. 45, Section 4A.7 (See Appendix 2 Enclosure 9).

3. ASTM-C90-75 "Hollow Load-Bearing Concrete Masonry Units".

4. Burns & Roe, Inc., Drawing No. 4514-3 "Misc. Plans Sections and Details (Masonry)".

5. Impell Calculation No's. 0370-055-008, 0370-055-009, 0370-055-010, 0370-055-011.

6. NUREG/CR-1981-OCRL-53018 RD, RM - Seismic Review of Oyster Creek Nuclear Power Plant as Part of the Systematic Evaluation Program.

7. U.S. NRC Letter No. LS05-06-068, dated June 17, 1981: Site Specific Ground Response Spectra for SEP Plants located in the Eastern United States.

8. GPUN Calculation No. 1302X-322C-A06.

9. GPUN Calculation No. C-1302-150-5320-005.

10. JCPL/GPU Letter to NRC, dated September 19, 1980.

11. JCPL/GPU Letter to NRC, dated November 14, 1980.

12. JCPL/GPU Letter to NRC, dated April 30, 1981.

13. Impell Report No. 02-0370-1132, "Masonry Wall Failure Consequence Analysis", Rev. 1, May 1, 1984 and Impell Report No. 02-0370-1139, "OC-Containment Spray System Assessment Associated with the Postulated Collapse Stairwell Masonry Walls", Oct. 1983.

14. NRC Letter Docket No. 50-219, LS05-84-03-037 dated March 27, 1984, Subject: Licensee Request to Defer Modifications of Some of the Masonry Walls (I.E. Bulletin 80-11) Oyster Creek Nuclear Generating Station.

APPENDICES

APPENDIX 1

STATUS OF WALLS AFFECTED BY IE BULLETIN 80-11

STATUS OF WALLS AFFECTED BY I.E.B. #80-11

WALL NOS.	QUALIFYING METHOD			MODIFICATION STATUS				REMARKS
	PRE-EMPTED	STRESS ANALYSIS	OTHERS SEE REMARKS	No Modification Needed	Modification Completed	Modification to be completed prior to Restart during Re-Fueling Outage Cycle 10	Modification to be completed during the next Re-Fueling Outage Cycle 11	
1	X					X		
2			X			X		A net type vertical unistrut barrier will be provided to insure the wall can only fall away from the control panels. (Ref. 5)
3	X					X		
4	X					X		
5		X		X				
6		X		X				
7		X		X				
8		X					X	
9	X					X		
10	X				X			
11	X				X			
12	X				X			
13	X				X			
14	X				X			
15		X					X	
16	X					X		
17		X					X	
18		X					X	
19		X					X	
20		X					X	
21			X				X	WALL WILL BE REMOVED NEXT OUTAGE (CYC 11)
22		X				X		
23		X				X		
24		X					X	

STATUS OF WALLS AFFECTED BY I.E.B. #80-11

WALL NOS.	QUALIFYING METHOD			MODIFICATION STATUS				REMARKS
	PRE-EMPTED	STRESS ANALYSIS	OTHERS SEE REMARKS	No Modification Needed	Modification Completed	Modification to be completed prior to Restart during Re-Fueling Outage Cycle 10	Modification to be completed during the next Re-Fueling Outage Cycle 11	
25		X		X				
26		X		X				
27		X		X				
28		X					X	
29		X					X	
30		X					X	
31			X				X	Will be re-analyzed by a combined model of walls no. 31, 32, 33 and 45. 3-D Seismic applies
32			X				X	
33			X				X	
34	X				X			
35	X				X			
37	X				X			
38	X				X			
39	X				X			
40	X				X			
41	X				X			
42	X				X			
43		X					X	
44		X					X	
45			X				X	See remarks for wall nos. 31, 32 and 33.
46	X				X			
47	X				X			

APPENDIX 2

WALL SUPPORTS TO BE PROVIDED AS RESULT OF STRESS ANALYSIS

WALL SUPPORTS TO BE PROVIDED AS RESULT OF STRESS ANALYSIS

Wall No.	Top Supp.	Vertical Edge Support				Remarks
		N	E	S	W	
5						No modification is needed
6						No modification is needed
7						No modification is needed
8	yes					Provide intermediate bracing
15	yes					Provide intermediate bracing
17	yes				yes	
18	yes			yes		
19	yes					Provide Intermediate Bracing
20	yes					Provide Intermediate Bracing
21						Excluded from stress analysis. This wall will be removed during cyc. 11 outage. No modification is needed.
22	yes		yes*		yes	*Strengthen east edge with unistrut
23	yes				yes	Provide steel framing & bracing
24-1	yes	yes		yes		Provide steel framing & bracing
24-2	yes					
25						No modification is needed
26						No modification is needed
27						No modification is needed
28	yes					
29			yes		yes	Provide interm. framing (L-Shape) & bracing
30		yes		yes		Provide interm framing (L-Shape)
31						To be reanalyzed
32						To be reanalyzed
33						To be reanalyzed
43	yes					Provide add'l. support for equipment.
44	yes					
45						To be reanalyzed

Note: For Wall No. 2 a net type vertical unistrut barrier will be provided to insure the wall can only fall away from the control panels.

APPENDIX 3

Summary of Results

GENERAL NOTES FOR STRESS TABLES:

1. Wall No's. (2-1, 2-2, 2-3, 2-4) were removed from the scope of the stress analysis as explained in Section 2 of this report.

2. For Wall No's. 5, 6, 7, are qualified by one way cracked section model. The existing boundary supports are acceptable. No modification is needed.

3. Wall No's. 29 and 30 have been reanalyzed as a combination L Shape model; 3-directional seismic force was considered in this analysis.

4. Wall No's. 31, 32, 33 and 45 will be reanalyzed as a combination model; 3-directional seismic force will be considered in the analysis.

5. Wall No's. 25, 26, 27 have been heavily reinforced with unistrut, through bolts and bracings on both faces. No modification is necessary.

6. Wall No. 21 has been covered by consequence failure analysis and excluded from stress analysis. The failure of Wall No. 21 will not jeopardize the plant from a safe shutdown (Ref. 13). This wall will be completely removed during the next refueling outage (cycle 11).

7. Wall No. 42 has been preempted.

GENERAL NOTES

Type of Construction

1. All blocks are ASTM-C-90 hollow block
   Walls that are reinforced have vertical rebar and horizontal dur-o-wall as shown below.

   Vertical: Rebar Fy= 40,000 psi
   Horizontal: Dur-O-Wall Fy= 70,000 psi (ASTM-A-82)

Frequency Range - Hz

1. All edge conditions are Simple-Supported.
2. For 3-Edge support, the edge that has not counted for has been pointed out.
3. Additional supports have been noted.

ALLOWABLE STRESSES (psi)

Flexural Tensile Stresses	Load Combination	Normal to Bed Jt		Parallel to Bed Joint	
		Running Bond	Stack Bond	Running Bond	Stack Bond
1. Uncracked Section					
a. Hollow Block	OBE+DL	25	25	50	—
	SSE+DL	41.5	41.5	83	—
b. Hollow Blk. Fully Grouted	OBE+DL	50	40	75	—
	SSE+DL	83.5	67	125	—
2. Cracked Section		Vertical Rebar		Horizontal Dur-o-Wall	
a. Steel	OBE+DL	20,000*		30,000	
	SSE+DL	36,000*		63,000	
b. Concrete Compressive Stresses	OBE+DL	396			
	SSE+DL	1020			
Shear Stresses		Out of Plane Flex-Shear		In Plane Shear	
		Running Bond	Stack Bond	Running Bond	Stack Bond
	OBE+DL	38.1	25.4	31.2	20.8
	SSE+DL	49.5	33.0	40.6	27.1
Bond Stress	OBE+DL	140			
	SSE+DL	186			

*Except walls 5, 6, 7, where rebar is A615 Grade 60: OBE+DL allowable 24,000
SSE+DL allowable 54,000

SUMMARY OF RESULTS

Location	Turbine Building, Observation Room Enclosure, South Wall Floor Elev. 49'-8"	
Dimensions of Model	Height: 10 Ft 10 In. Width: 14 Ft 11 In.	Thickness: 8 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" (X) Reinforced ( ) Unreinforced	(X) Running Bond ( ) Stacked Bond (X) Other Fully grouted block
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span ( ) Horizontal Span	13.51 To 16.55
	(X) Two Way (X) 4-Edge Support ( ) 3- Edge Support ( ) Top, ( ) Side, Missing	20.18 To 24.72
Response Acceleration (Uncracked Section)	(X) One Way 1.52 g, (OBE) 1.99 g, (SSE)	( ) Two Way: 0.40 g, (OBE) 0.76 g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	(X) One Way: (X) Normal to Bed Joint, ( ) Parallel to Bed Joint,	229.3 (OBE+DL) vs 50.0 (Allowable) 299.0 (SSE+DL) vs 83.5 (Allowable) (OBE+DL) vs (Allowable) (SSE+DL) vs (Allowable)
	(X) Two Way: (X) Normal to Bed Joint, (X) Parallel to Bed Joint,	34.5 (OBE+DL) vs 50.0 (Allowable) 59.4 (SSE+DL) vs 83.5 (Allowable) 18.4 (OBE+DL) vs 75.0 (Allowable) 34.3 (SSE+DL) vs 125.0 (Allowable)
Remarks	Wall is good for two way model. However, in order not to install the horizontal boundary supports, one way cracked section analysis was performed. See next page for results.	Wall No: 5

SUMMARY OF RESULTS - (Cont'd.)

Frequency Range - Hz (Cracked Section)

(X) One Way
(X) Vertical Span — 3.60 To 4.41
( ) Horizontal Span

( ) Two Way
( ) 4-Edge Support
( ) 3-Edge Support — _____ To _____
( ) Top, ( ) Side, Missing

Response Acceleration (Cracked Section)

(X) One Way: 0.47 g, (OBE)
0.71 g, (SSE)

( ) Two Way: _____ g, (OBE)
_____ g, (SSE)

Flexural Tensile Stresses - psi (Cracked Section)

(X) One Way:
(X) Normal, ( ) parallel, to Bed Joint

$f_{(Steel)}$:	17,000 (OBE+DL)	vs	24,000 (Allowable)
	25,670 (SSE+DL)	vs	54,000 (Allowable)
$f_{(Conc.)}$: (Compression)	-341.0 (OBE+DL)	vs	-396.0 (Allowable)
	-515.0 (SSE+DL)	vs	-1020.0 (Allowable)

( ) Two Way:
( ) Normal to Bed Joint

$f_{(Steel)}$:	_____ (OBE+DL)	vs	_____ (Allowable)
	_____ (SSE+DL)	vs	_____ (Allowable)
$f_{(Conc.)}$:	_____ (OBE+DL)	vs	_____ (Allowable)
	_____ (SSE+DL)	vs	_____ (Allowable)

( ) Parallel to Bed Joint

$f_{(Steel)}$:	_____ (OBE+DL)	vs	_____ (Allowable)
	_____ (SSE+DL)	vs	_____ (Allowable)

Remarks Wall is good for one way cracked section. No horizontal boundary support is needed. Wall No. 5

SUMMARY OF RESULTS

Location	Turbine Building, Observation Room Enclosure South-East to North-West Wall Floor Elev. 49'-8"	
Dimensions of Model	Height: 10 Ft 10 In. Width: 7 Ft 6 In.	Thickness: 8 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" (X) Reinforced ( ) Unreinforced	(X) Running Bond ( ) Stacked Bond (X) Other Fully grouted block
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span ( ) Horizontal Span	13.48 To 16.51
	(X) Two Way (X) 4-Edge Support ( ) 3- Edge Support ( ) Top, ( ) Side, Missing	39.37 To 48.22
Response Acceleration (Uncracked Section)	(X) One Way 1.52 g, (OBE) 1.99 g, (SSE)	(X) Two Way: 0.18 g, (OBE) 0.35 g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	(X) One Way: (X) Normal to Bed Joint,	241.4 (OBE+DL) vs 50.0 (Allowable) 314.0 (SSE+DL) vs 83.5 (Allowable)
	( ) Parallel to Bed Joint,	____ (OBE+DL) vs ____ (Allowable) ____ (SSE+DL) vs ____ (Allowable)
	(X) Two Way: (X) Normal to Bed Joint,	14.4 (OBE+DL) vs 50.0 (Allowable) 16.6 (SSE+DL) vs 83.5 (Allowable)
	(X) Parallel to Bed Joint,	11.8 (OBE+DL) vs 75.0 (Allowable) 19.7 (SSE+DL) vs 125.0 (Allowable)
Remarks	Wall is good for two way model. However, in order not to install the horizontal boundary supports, one way cracked section analysis was performed. See next page for results	Wall No: 6

SUMMARY OF RESULTS - (Cont'd.)

Frequency Range - Hz (Cracked Section)

(X) One Way
(X) Vertical Span — 3.60 To 4.41
( ) Horizontal Span

( ) Two Way
( ) 4-Edge Support
( ) 3-Edge Support — _____ To _____
( ) Top, ( ) Side, Missing

Response Acceleration (Cracked Section)

(X) One Way: 0.47 g, (OBE)
0.71 g, (SSE)

( ) Two Way: _____ g, (OBE)
_____ g, (SSE)

Flexural Tensile Stresses - psi (Cracked Section)

(X) One Way:
(X) Normal, ( ) parallel, to Bed Joint

$f_{(Steel)}$:	17,000 (OBE+DL)	vs	24,000 (Allowable)
	25,670 (SSE+DL)	vs	54,000 (Allowable)
$f_{(Conc.)}$: (Compression)	-341.0 (OBE+DL)	vs	-396.0 (Allowable)
	-515.0 (SSE+DL)	vs	-1020.0 (Allowable)

( ) Two Way:
( ) Normal to Bed Joint

$f_{(Steel)}$:	_____ (OBE+DL)	vs	_____ (Allowable)
	_____ (SSE+DL)	vs	_____ (Allowable)
$f_{(Conc.)}$:	_____ (OBE+DL)	vs	_____ (Allowable)
	_____ (SSE+DL)	vs	_____ (Allowable)

( ) Parallel to Bed Joint

$f_{(Steel)}$:	_____ (OBE+DL)	vs	_____ (Allowable)
	_____ (SSE+DL)	vs	_____ (Allowable)

Remarks Wall is good for one way cracked section. No horizontal boundary support is needed. Wall No. 6

SUMMARY OF RESULTS

Location	Turbine Building, Observation Room Enclosure West Wall Floor Elev. 49'-8"
Dimensions of Model	Height: 10 Ft 10 In. Thickness: 8 In. Width: 7 Ft 0 In.
Type of Construction	Block: ASTM-C-90 (X) Running Bond Mortar: Type "M" ( ) Stacked Bond (X) Reinforced (X) Other grouted block ( ) Unreinforced
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span 13.98 To 17.12 ( ) Horizontal Span
	(X) Two Way (X) 4-Edge Support 45.30 To 55.48 ( ) 3- Edge Support ( ) Top, ( ) Side, Missing
Response Acceleration (Uncracked Section)	(X) One Way 1.52 g, (OBE) ; 1.99 g, (SSE) (X) Two Way: 0.18 g, (OBE) ; 0.35 g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	(X) One Way: (X) Normal to Bed Joint, 224.0 (OBE+DL) vs 50.0 (Allowable) 291.7 (SSE+DL) vs 83.5 (Allowable) ( ) Parallel to Bed Joint, ____ (OBE+DL) vs ____ (Allowable) ____ (SSE+DL) vs ____ (Allowable)
	(X) Two Way: (X) Normal to Bed Joint, 10.0 (OBE+DL) vs 50.0 (Allowable) 11.7 (SSE+DL) vs 83.5 (Allowable) (X) Parallel to Bed Joint, 5.9 (OBE+DL) vs 75.0 (Allowable) 11.8 (SSE+DL) vs 125.0 (Allowable)
Remarks	Wall is good for Two Way Model. However, in order not to install the horizontal boundary supports, one way cracked section analysis was performed. See next page for results
	Wall No: 7

Frequency Range - Hz (Cracked Section)

(X) One Way
(X) Vertical Span — 3.60 To 4.41
( ) Horizontal Span

( ) Two Way
( ) 4-Edge Support
( ) 3-Edge Support — To
( ) Top, ( ) Side, Missing

Response Acceleration (Cracked Section)

(X) One Way: 0.47 g, (OBE)
0.71 g, (SSE)

( ) Two Way: g, (OBE)
g, (SSE)

Flexural Tensile Stresses - psi (Cracked Section)

(X) One Way:
(X) Normal, ( ) parallel, to Bed Joint

$f_{(Steel)}$:	17,000 (OBE+DL)	vs	24,000 (Allowable)
	25,670 (SSE+DL)	vs	54,000 (Allowable)
$f_{(Conc.)}$: (Compression)	-341.0 (OBE+DL)	vs	-396.0 (Allowable)
	-515.0 (SSE+DL)	vs	-1020.0 (Allowable)

( ) Two Way:
( ) Normal to Bed Joint

$f_{(Steel)}$:	(OBE+DL)	vs	(Allowable)
	(SSE+DL)	vs	(Allowable)
$f_{(Conc.)}$:	(OBE+DL)	vs	(Allowable)
	(SSE+DL)	vs	(Allowable)

( ) Parallel to Bed Joint

$f_{(Steel)}$:	(OBE+DL)	vs	(Allowable)
	(SSE+DL)	vs	(Allowable)

Remarks Wall is good for one way cracked section. No horizontal boundary support is needed — Wall No. 7

SUMMARY OF RESULTS

Location	Office Building, Cable Tray Area, East Wall, Intermdediate Section, Elev. 46'-6"
Dimensions of Model	Height: 12 Ft 10 In. Thickness: 6 In. Width: 21 Ft 3 In.
Type of Construction	Block: ASTM-C-90 ( ) Running Bond Mortar: Type "M" (X) Stacked Bond ( ) Reinforced ( ) Other _____ (X) Unreinforced
Frequency Range - Hz (Uncracked Section)	(X) One (X) Vertical Span w/intermediate supports 15.90 To 20.53 ( ) Horizontal Span
	( ) Two Way ( ) 4-Edge Support _____ To _____ ( ) 3- Edge Support ( ) Top, ( ) Side, Missing
Response Acceleration (Uncracked Section)	(X) One Way 0.17 g, (OBE) 0.34 g, (SSE)
	( ) Two Way: _____ g, (OBE) _____ g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	(X) One Way: (X) Normal to Bed Joint, 21.8 (OBE+DL) vs 25.0 (Allowable) 40.2 (SSE+DL) vs 41.5 (Allowable) ( ) Parallel to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
	( ) Two Way: ( ) Normal to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable) ( ) Parallel to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
Remarks	Wall is good for one way with intermediate & top supports.
	Wall No: 8

SUMMARY OF RESULTS

Location	Office Building, Monitor and Change Room, South Wall, Intermediate Section Elev. 46'-6"
Dimensions of Model	Height: 13 Ft 4 In. Thickness: 6 In. Width: 15 Ft 10 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" ( ) Reinforced (X) Unreinforced ( ) Running Bond (X) Stacked Bond ( ) Other _____
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span w/interm supports 24.90 To 32.15 ( ) Horizontal Span
	( ) Two Way ( ) 4-Edge Support _____ To _____ ( ) 3- Edge Support ( ) Top, ( ) Side, Missing
Response Acceleration (Uncracked Section)	(X) One Way 0.16 g, (OBE) 0.32 g, (SSE)
	( ) Two Way: _____ g, (OBE) _____ g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	(X) One Way: (X) Normal to Bed Joint, 5.6 (OBE+DL) vs 25.0 (Allowable) 15.7 (SSE+DL) vs 41.5 (Allowable) ( ) Parallel to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
	( ) Two Way: ( ) Normal to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable) ( ) Parallel to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
Remarks	Wall is good for one way with interm ediate & top supports.
	Wall No: 15

SUMMARY OF RESULTS

Location	Office Bldg. Battery Room South Wall, West Section Fl. El. 35'-0"
Dimensions of Model	Height: 11 Ft 0 In. Thickness: 6 In. Width: 14 Ft 11 In.
Type of Construction	Block: ASTM - C-90 Mortar: Type "M" ( ) Reinforced (X) Unreinforced (X) Running Bond ( ) Stacked Bond ( ) Other
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span 10.19 To 13.15 ( ) Horizontal Span
	(X) Two Way (X) 4-Edge Support 15.22 To 19.65 ( ) 3-Edge Support ( ) Top, ( ) Side, Missing
Response Acceleration (Uncracked Section)	(X) One Way: 0.22 g, (OBE) 0.41 g, (SSE) ( ) Two Way: 0.34 g, (OBE) 0.50 g, (SSE)
Flexural Tensile Stresses - psi (Uncracked Section)	(X) One Way: (X) Normal to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) 68.3 (SSE+DL) vs 41.5 (Allowable) ( ) Parallell to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
	(X) Two Way: (X) Normal to Bed Joint, 25.1 (OBE+DL) vs 25.0 (Allowable) 38.7 (SSE+DL) vs 41.5 (Allowable) (X) Parallel to Bed Joint, 19.1 (OBE+DL) vs 50.0 (Allowable) 27.0 (SSE+DL) vs 83.0 (Allowable)
Remarks	O.K. for Two-Way Model with top and vertical edge supports.
	Wall No. 17

SUMMARY OF RESULTS

Location	Office Bldg. Battery Room West Wall, South Section Fl. El. 35'-0"
Dimensions of Model	Height: 11 Ft 0 In. Thickness: 6 In. Width: 13 Ft 5 In.
Type of Construction	Block: ASTM - C-90 Mortar: Type "M" ( ) Reinforced (X) Unreinforced (X) Running Bond ( ) Stacked Bond ( ) Other
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span 10.23 To 13.21 ( ) Horizontal Span (X) Two Way (X) 4-Edge Support 16.73 To 21.60 ( ) 3-Edge Support ( ) Top, ( ) Side, Missing
Response Acceleration (Uncracked Section)	(X) One Way: 0.22 g, (OBE) 0.41 g, (SSE) (X) Two Way: 0.33 g, (OBE) 0.60 g, (SSE)
Flexural Tensile Stresses - psi (Uncracked Section)	(X) One Way: (X) Normal to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) 65.2 (SSE+DL) vs 41.5 (Allowable) ( ) Parallell to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable) (X) Two Way: (X) Normal to Bed Joint, 18.24 (OBE+DL) vs 25.0 (Allowable) 36.4 (SSE+DL) vs 41.5 (Allowable) (X) Parallel to Bed Joint, 16.30 (OBE+DL) vs 50.0 (Allowable) 28.6 (SSE+DL) vs 83.0 (Allowable)
Remarks	O.K. for Two-Way Model, with top and vertical edge supports.

Wall No. 18

SUMMARY OF RESULTS

Location	Office Bldg. Elect, Tray Room North Wall Fl. El. 35'-0"	
Dimensions of Model	Height: 11 Ft 0 In. Width: 10 Ft 6 In.	Thickness: 6 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" ( ) Reinforced (X) Unreinforced	( ) Running Bond (X) Stacked Bond ( ) Other _____
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span w/intermediate supports ( ) Horizontal Span	25.17 To 32.49
	( ) Two Way ( ) 4-Edge Support ( ) 3- Edge Support ( ) Top, ( ) Side, Missing	_____ To _____
Response Acceleration (Uncracked Section)	(X) One Way 0.16 g, (OBE) 0.32 g, (SSE)	( ) Two Way: _____ g, (OBE) _____ g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	(X) One Way: (X) Normal to Bed Joint, ( ) Parallel to Bed Joint,	11.6 (OBE+DL) vs 25.0 (Allowable) 24.4 (SSE+DL) vs 41.5 (Allowable) _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
	( ) Two Way: ( ) Normal to Bed Joint, ( ) Parallel to Bed Joint,	_____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable) _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
Remarks	Wall is good for one way with intermediate and top supports.	Wall No: 19

SUMMARY OF RESULTS

Location	Office Bldg. Elect. Tray Room East Wall Fl. El. 35'-0"
Dimensions of Model	Height: 11 Ft 0 In. Thickness: 6 In. Width: 16 Ft 2.5 In.
Type of Construction	Block: ASTM-C-90 ( ) Running Bond Mortar: Type "M" (X) Stacked Bond ( ) Reinforced ( ) Other _____ (X) Unreinforced
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span w/intermediate support 20.96 To 27.06 ( ) Horizontal Span
	( ) Two Way ( ) 4-Edge Support _____ To _____ ( ) 3- Edge Support ( ) Top, ( ) Side, Missing
Response Acceleration (Uncracked Section)	(X) One Way 0.16 g, (OBE) 0.32 g, (SSE) ( ) Two Way: _____ g, (OBE) _____ g, (SSE)
Flexural Tensile Stresses - psi (Uncracked Section)	(X) One Way: (X) Normal to Bed Joint, 18.0 (OBE+DL) vs 25.0 (Allowable) 33.6 (SSE+DL) vs 41.5 (Allowable) ( ) Parallel to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
	( ) Two Way: ( ) Normal to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable) ( ) Parallel to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
Remarks	Wall is good for one way with intermediate & top supports. Wall No: 20

SUMMARY OF RESULTS

Location	Office Bldg. Switchgear Room Partition Wall, East Section Fl. El. 23'-6"	
Dimensions of Model	Height: 9 Ft 0 In. Width: 17 Ft 8.5 In.	Thickness: 8 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" ( ) Reinforced (X) Unreinforced	(X) Running Bond ( ) Stacked Bond ( ) Other _____
Frequency Range - Hz (Uncracked Section)	( ) One ( ) Vertical Span ( ) Horizontal Span	_____ To _____
	(X) Two Way ( ) 4-Edge Support (X) 3- Edge Support w/free edge strengthened ( ) Top, (x) Side, Missing	22.6 To 29.2
Response Acceleration (Uncracked Section)	( ) One Way _____ g, (OBE) _____ g, (SSE)	(X) Two Way: 0.44 g, (OBE) 0.70 g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	( ) One Way: ( ) Normal to Bed Joint, ( ) Parallel to Bed Joint,	_____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable) _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
	(X) Two Way: (X) Normal to Bed Joint, (X) Parallel to Bed Joint,	21.1 (OBE+DL) vs 25.0 (Allowable) 33.4 (SSE+DL) vs 41.5 (Allowable) Negligible (OBE+DL) vs 50.0 (Allowable) Negligible (SSE+DL) vs 75.0 (Allowable)
Remarks	Wall is good for two way with top support and free edge reinforced.	Wall No: 22

SUMMARY OF RESULTS

Location	Office Bldg. Switchgear Room Partition Wall Fl. El. 23'-6"
Dimensions of Model	Height: 11 Ft 0 In. Thickness: 8 In. Width: 23 Ft 0 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" ( ) Reinforced (X) Unreinforced (X) Running Bond ( ) Stacked Bond ( ) Other _____
Frequency Range - Hz (Uncracked Section)	( ) One ( ) Vertical Span _____ To _____ ( ) Horizontal Span
	(X) Two Way ( ) 4-Edge Support 39.8 To 51.4 (X) 3- Edge Support w/additional framing and bracing ( ) Top, (X) Side, Missing
Response Acceleration (Uncracked Section)	( ) One Way _____ g, (OBE) _____ g, (SSE) (X) Two Way: 0.45 g, (OBE) 0.65 g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	( ) One Way: ( ) Normal to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable) ( ) Parallel to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
	(X) Two Way: (X) Normal to Bed Joint, 25.1 (OBE+DL) vs 25.0 (Allowable) 35.6 (SSE+DL) vs 41.5 (Allowable) (X) Parallel to Bed Joint, 35.2 (OBE+DL) vs 50.0 (Allowable) 50.1 (SSE+DL) vs 75.0 (Allowable)
Remarks	Wall is good for two way with top & vertical edge and intermediate supports. Wall No: 23

SUMMARY OF RESULTS

Location	Turbine Building, North East Stairwell West Wall, Lower Part Floor Elev. 23'-6"	
Dimensions of Model	Height: 17 Ft 11 In. Width: 13 Ft 9 In.	Thickness: 8 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" ( ) Reinforced (X) Unreinforced	(X) Running Bond ( ) Stacked Bond ( ) Other _____
Frequency Range - Hz (Uncracked Section)	( ) One ( ) Vertical Span ( ) Horizontal Span	_____ To _____
	(X) Two Way (X) 4-Edge Support w/ add'l. frame and supports ( ) 3- Edge Support ( ) Top, ( ) Side, Missing	26.0 To 33.6
Response Acceleration (Uncracked Section)	( ) One Way _____ g, (OBE) _____ g, (SSE)	(X) Two Way: 0.18 g, (OBE) 0.31 g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	( ) One Way: ( ) Normal to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable) ( ) Parallel to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)	
	(X) Two Way: (X) Normal to Bed Joint, 6.4 (OBE+DL) vs 25.0 (Allowable) 13.6 (SSE+DL) vs 41.5 (Allowable) (X) Parallel to Bed Joint, Negligible (OBE+DL) vs 50.0 (Allowable) Negligible (SSE+DL) vs 75.0 (Allowable)	
Remarks	Wall is good for two way with top & edge supports and steel frame provided.	Wall No: 24-1

SUMMARY OF RESULTS

Location	Turbine Building, North East Stairwell West Wall, Upper Part, Floor Elev. 23'-6"	
Dimensions of Model	Height: 8 Ft 6 In. Width: 13 Ft 9 In.	Thickness: 8 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" ( ) Reinforced (X) Unreinforced	(X) Running Bond ( ) Stacked Bond ( ) Other _____
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span ( ) Horizontal Span	23.03 To 29.73
	( ) Two Way ( ) 4-Edge Support ( ) 3- Edge Support ( ) Top, ( ) Side, Missing	_____ To _____
Response Acceleration (Uncracked Section)	( ) One Way 0.17 g, (OBE) 0.32 g, (SSE)	( ) Two Way: _____ g, (OBE) _____ g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	(X) One Way: (X) Normal to Bed Joint, ( ) Parallel to Bed Joint,	25.0 (OBE+DL) vs 25.0 (Allowable) 35.7 (SSE+DL) vs 41.5 (Allowable) _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
	( ) Two Way: ( ) Normal to Bed Joint, ( ) Parallel to Bed Joint,	_____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable) _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
Remarks	Wall is good for one way model with top support.	Wall No: 24-2

SUMMARY OF RESULTS

Location	Turbine Building, Cable Spread Room, West Wall, South Section Floor Elev. 36'-0"	
Dimensions of Model	Height: 9 Ft 0 In. Width: 9 Ft 3 In.	Thickness: 8 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" ( ) Reinforced (X) Unreinforced	(X) Running Bond ( ) Stacked Bond (X) Other Wall reinforced w/unistrut on both sides w/thru bolts
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span ( ) Horizontal Span	49.8 To 64.2
	( ) Two Way ( ) 4-Edge Support ( ) 3- Edge Support ( ) Top, ( ) Side, Missing	To
Response Acceleration (Uncracked Section)	(X) One Way 0.20 g, (OBE) 0.35 g, (SSE)	( ) Two Way: g, (OBE) g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	(X) One Way: (X) Normal to Bed Joint,	25.6 (OBE+DL) vs 25.0 (Allowable) 36.0 (SSE+DL) vs 41.5 (Allowable)
	( ) Parallel to Bed Joint,	(OBE+DL) vs (Allowable) (SSE+DL) vs (Allowable)
	( ) Two Way: ( ) Normal to Bed Joint,	(OBE+DL) vs (Allowable) (SSE+DL) vs (Allowable)
	( ) Parallel to Bed Joint,	(OBE+DL) vs (Allowable) (SSE+DL) vs (Allowable)
Remarks	Wall is good for One Way Model	Wall No: 25

SUMMARY OF RESULTS

Location	Turbine Building Cable Spread Room, West Section of North Wall, Floor Elev. 36'-0"	
Dimensions of Model	Height: 9 Ft 0 In. Width: 30 Ft 8 In.	Thickness: 8 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" ( ) Reinforced (X) Unreinforced	(X) Running Bond ( ) Stacked Bond (X) Other Wall reinforced with unistrut in both sides with thru bolts
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span ( ) Horizontal Span	26.09 To 33.68
	(X) Two Way (X) 4-Edge Support ( ) 3- Edge Support ( ) Top, ( ) Side, Missing	28.02 To 36.18
Response Acceleration (Uncracked Section)	(X) One Way 0.33 g, (OBE) 0.54 g, (SSE)	(X) Two Way: 0.25 g, (OBE) 0.50 g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	(X) One Way: (X) Normal to Bed Joint, ( ) Parallel to Bed Joint,	38.1 (OBE+DL) vs 25.0 (Allowable) 51.4 (SSE+DL) vs 41.5 (Allowable) (OBE+DL) vs (Allowable) (SSE+DL) vs (Allowable)
	(X) Two Way: (X) Normal to Bed Joint, (X) Parallel to Bed Joint,	24.1 (OBE+DL) vs 25.0 (Allowable) 35.5 (SSE+DL) vs 41.5 (Allowable) 3.8 (OBE+DL) vs 50.0 (Allowable) 11.6 (SSE+DL) vs 83.0 (Allowable)
Remarks	Wall is good for two way model	Wall No: 26

SUMMARY OF RESULTS

Location	Turbine Building, Cable Spread Room North-South Wall on Column Line H. Floor Elev. 36'-0"	
Dimensions of Model	Height: 9 Ft 0 In. Width: 3 Ft 4 In.	Thickness: 8 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" ( ) Reinforced (X) Unreinforced	(X) Running Bond ( ) Stacked Bond (X) Other Wall reinforced with unistrut on both sides with thru bolts
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span ( ) Horizontal Span	26.29 To 33.94
	( ) Two Way ( ) 4-Edge Support ( ) 3- Edge Support ( ) Top, ( ) Side, Missing	To
Response Acceleration (Uncracked Section)	(X) One Way 0.33 g, (OBE) 0.54 g, (SSE)	( ) Two Way: g, (OBE) g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	(X) One Way: (X) Normal to Bed Joint, ( ) Parallel to Bed Joint,	20.5 (OBE+DL) vs 25.0 (Allowable) 29.6 (SSE+DL) vs 41.5 (Allowable) (OBE+DL) vs (Allowable) (SSE+DL) vs (Allowable)
	( ) Two Way: ( ) Normal to Bed Joint, ( ) Parallel to Bed Joint,	(OBE+DL) vs (Allowable) (SSE+DL) vs (Allowable) (OBE+DL) vs (Allowable) (SSE+DL) vs (Allowable)
Remarks	Wall is good for One Way Model	Wall No: 27

SUMMARY OF RESULTS

Location	Turbine Building, North East Stairwell from Turbine Operating Floor, West Wall Floor Elev. 46'-6"
Dimensions of Model	Height: 8 Ft 3 In. Thickness: 8 In. Width: 21 Ft 4 In.
Type of Construction	Block: ASTM-C-90 (X) Running Bond Mortar: Type "M" ( ) Stacked Bond ( ) Reinforced ( ) Other _____ (X) Unreinforced
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span 25.1 To 32.4 ( ) Horizontal Span
	( ) Two Way ( ) 4-Edge Support _____ To _____ ( ) 3- Edge Support ( ) Top, ( ) Side, Missing
Response Acceleration (Uncracked Section)	(X) One Way 0.33 g, (OBE) 0.54 g, (SSE)
	( ) Two Way: _____ g, (OBE) _____ g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	(X) One Way: (X) Normal to Bed Joint, 23.4 (OBE+DL) vs 25.0 (Allowable) 32.2 (SSE+DL) vs 41.5 (Allowable) ( ) Parallel to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
	( ) Two Way: ( ) Normal to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable) ( ) Parallel to Bed Joint, _____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
Remarks	Wall is good for one way model with top support. Wall No: 28

SUMMARY OF RESULTS

Location	Reactor Bldg. Southeast Stairwell North Wall Fl. El. (-) 19'-6"
Dimensions of Model	Height: 36 Ft 9.5 In. Thickness: 8 In. Width: 16 Ft 6 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" (X) Reinforced ( ) Unreinforced ( ) Running Bond (X) Stacked Bond ( ) Other _____

SEE PAGE 3-25 FOR

COMBINATION MODEL ANALYSIS

Wall No: 29

SUMMARY OF RESULTS

Location	Reactor Bldg. Southeast Stair Well West Wall Fl. El. (-) 19'-6"
Dimensions of Model	Height: 38 Ft 2.5 In. Thickness: 8 In. Width: 8 Ft 3 In.
Type of Construction	Block: ASTM-C-90 ( ) Running Bond Mortar: Type "M" (X) Stacked Bond (X) Reinforced ( ) Other _____ ( ) Unreinforced

SEE PAGE 3-25 FOR

COMBINATION MODEL ANALYSIS

Wall No: 30

SUMMARY OF RESULTS - (Cont'd.)

Frequency Range - Hz (Cracked Section)	( ) One Way ( ) Vertical Span ( ) Horizontal Span	_____ To _____
	(X) Two Way (X) 4-Edge Support* ( ) 3-Edge Support ( ) Top, ( ) Side, Missing *w/additional 2 L shape beams & bracings	6.79 To 8.32(N-S) dir 17.37 To 21.27(E-W)dir
Response Acceleration (Cracked Section)	( ) One Way: _____g, (OBE) _____g, (SSE)	(X) Two Way: 0.31g(N-S)dir OBE 0.15g (E-W)dir SSE 0.51g(N-S)dir 0.30g(E-W)dir
Flexural Tensile Stresses - psi (Cracked Section)	( ) One Way: ( ) Normal, ( ) parallel, to Bed Joint	
	$f_{(Steel)}$: _____ (OBE+DL) vs _____ (Allowable)	
	_____ (SSE+DL) vs _____ (Allowable)	
	$f_{(Conc.)}$: (Compression) _____ (OBE+DL) vs _____ (Allowable)	
	_____ (SSE+DL) vs _____ (Allowable)	
	(X) Two Way: (X) Normal to Bed Joint	
	$f_{(Steel)}$: 3816 (OBE+DL) vs 20,000 (Allowable)	
	6303 (SSE+DL) vs 36,000 (Allowable)	
	$f_{(Conc.)}$: -100 (OBE+DL) vs -396 (Allowable)	
	-166 (SSE+DL) vs -1020 (Allowable)	
	(X) Parallel to Bed Joint	
	$f_{(Steel)}$: 10,467 (OBE+DL) vs 30,000 (Allowable)	
	17,326 (SSE+DL) vs 63,000 (Allowable)	
Remarks	Combination Model Good for Cracked Section with two L Shape Beams & Bracings Provided	Wall No. 29&30

SUMMARY OF RESULTS

Location	Reactor Bldg. Shutdown Heat Exchanger Room. North Wall, Interm. Section Fl. El. 51'-3"	
Dimensions of Model	Height: 9 Ft 11 In. Width: 14 Ft 11 In.	Thickness: 24 In.
Type of Construction	Block: ASTM-C-90 Mortar: Type "M" ( ) Reinforced (X) Unreinforced	( ) Running Bond (X) Stacked Bond (X) Other grouted double Wythe 12 in. each wythe.
Frequency Range - Hz (Uncracked Section)	(X) One Way (X) Vertical Span ( ) Horizontal Span	25.03 To 30.65
	( ) Two Way ( ) 4-Edge Support ( ) 3- Edge Support ( ) Top, ( ) Side, Missing	To
Response Acceleration (Uncracked Section)	(X) One Way 0.32 g, (OBE) 0.52 g, (SSE)	( ) Two Way: g, (OBE) g, (SSE)
Flexural Tensile Stresses - psi (Uncrakced Section)	(X) One Way: (X) Normal to Bed Joint,	25.4 (OBE+DL) vs 40.0 (Allowable) 43.1 (SSE+DL) vs 67.0 (Allowable)
	( ) Parallel to Bed Joint,	(OBE+DL) vs (Allowable) (SSE+DL) vs (Allowable)
	( ) Two Way: ( ) Normal to Bed Joint,	(OBE+DL) vs (Allowable) (SSE+DL) vs (Allowable)
	( ) Parallel to Bed Joint,	(OBE+DL) vs (Allowable) (SSE+DL) vs (Allowable)
Remarks	O.K. for One Way Model with top support. Provide additional support for equipment.	Wall No: 43

SUMMARY OF RESULTS

Location	Turbine Building, North East Stairwell from turbine Operating Floor, North Wall Floor Elev. 46'-6"	
Dimensions of Model	Height: 8 Ft 3 In. Width: 5 Ft 10 In.	Thickness: 8 In.
Type of Construction	Block: ASTM - C-90 Mortar: Type "M" ( ) Reinforced (x) Unreinforced	(x) Running Bond ( ) Stacked Bond ( ) Other _____
Frequency Range - Hz (Uncracked Section)	(x) One Way (x) Vertical Span ( ) Horizontal Span	25.15 To 32.47
	( ) Two Way ( ) 4-Edge Support ( ) 3-Edge Support ( ) Top, ( ) Side, Missing	_____ To _____
Response Acceleration (Uncracked Section)	(X) One Way: 0.33 g, (OBE) 0.54 g, (SSE)	( ) Two Way: _____ g, (OBE) _____ g, (SSE)
Flexural Tensile Stresses - psi (Uncracked Section)	(x) One Way: (x) Normal to Bed Joint,	23.1 (OBE+DL) vs 25.0 (Allowable) 33.7 (SSE+DL) vs 41.5 (Allowable)
	( ) Parallell to Bed Joint,	_____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
	( ) Two Way: ( ) Normal to Bed Joint,	_____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
	( ) Parallel to Bed Joint,	_____ (OBE+DL) vs _____ (Allowable) _____ (SSE+DL) vs _____ (Allowable)
Remarks	Wall is good for one way model with top support.	Wall No. 44

CALCULATED SHEAR STRESSES AND ALLOWABLES FOR RUNNING BOND WALLS

Wall No.	Out of Plane Flexural Shear (PSI)		In Plane Shear (PSI)		REMARKS
	OBE	SSE	OBE	SSE	
5	6.6	9.9			Results are calculated for the critical wall No. 6.
6	6.6	9.9			
7	6.6	9.9	2.7	5.3	
17	9.3	12.8			
18	7.0	11.3			
21					Deleted from Anal.
22	7.7	12.1			
23	11.1	15.3			
24-1	3.6	7.9			Results are calculated for the critical wall No. 24-1.
24-2	3.6	7.9			
25	8.9	13.3			
26	11.2	17.0			
27	7.8	11.9			
28	11.1	17.1			
44	6.3	10.3			
Allow. Stresses (PSI)	38.1		31.2		OBE
		49.5		40.6	1.3 (OBE)

Note: In plane shear stress is not critical wherever it is not given.

CALCULATED SHEAR STRESSES AND ALLOWABLES FOR STACKED BOND WALLS

Wall No.	Out-of-Plane Flexural (Shear (PSI)		In-Plane Shear Shear (PSI)		REMARKS
	OBE	SSE	OBE	SSE	
8	8.2	13.3			
15	4.0	7.3			
19	5.3	9.3			
20	5.2	9.1			
29 & 30	10.0	16.0	17.0	27.0	Combination Model with 3-D Seismic Force
31					To be analyzed later
32					To be analyzed later
33					To be analyzed later
43	3.1	4.9			
45					To be analyzed later
Allow. Stresses (PSI)	25.4		20.8		OBE
		33.0		27.1	1.3 (OBE)

Note: In plane shear stress is not critical wherever it is not given.

OYSTER CREEK NUCLEAR STATION

IN PLANE STRAIN DUE TO OBE

Bldg. Model	Flr. Mass No.	Flr. Elev.	Max. Disp.	Story Height	Diff. Disp.	In-Plane Strain	Remarks	Results
	5	75.25	2.795×10^{-3}	24.00	0.868×10^{-3}	3.62×10^{-5}	Allowable Strain $\gamma_c \leq 8 \times 10^{-4}$	All Walls Satisfy In-Plane Strain Req't
Reactor	6	51.25	1.927	27.75	0.994	3.58		
Bldg.	7	23.50	0.933	23.50	0.473	2.01		
	8	0.00	0.460	19.00	0.460	2.42		
	Base	-19.00	0.000	--	--			
Turbine	1	46.50	0.599	23.00	0.282	1.23		
Bldg.	2	23.50	0.317	23.50	0.317	1.35		
	Base	0.00	0.000	--	--			

NOTES: 1. All masonry walls investigated are within the scope of the tabulated elev. and classified as confined walls.

2. All linear units in ft.

OYSTER CREEK NUCLEAR STATION
IN PLANE STRAIN DUE TO SSE

BLDG Model	FLR MASS No.	FLR ELEV.	MAX DISP.	Story Height	Diff. DISP.	IN PLANE STRAIN	REMARKS	RESULTS
Reactor BLDG	5	75.25	5.591×10^{-3}	24.00	1.738×10^{-3}	7.24×10^{-5}	Allowable Strain $\gamma_c \leq 1.33 \times 10^{-3}$	All Walls satisfy In-Plane strain requirement
	6	51.25	3.853	27.75	1.986	7.16		
	7	23.50	1.867	23.50	0.947	4.03		
	8	0.00	0.920	19.00	0.920	4.84		
	Base	-19,00	0.000	———	———			
Turbine Bldg	2	46.50	1.197	23.00	0.564	2.45		
	1	23.50	0.633	23.50	0.633	2.69		
	Base	0.00	0.000	———	———			

For Notes see the Preceeding page.