1 January 2019
EDRT:
Section 2.3, please discuss/clarify the rational for the design strips used to verify the mat performance in SAFE. More traditionally design strips are assigned based on column locations, identifying column and middle strips. How would using narrower strips affect the results? (applies also to mat verification in Volume 3)

06 March 2019
Simpson Gumpertz & Heger Inc.:
Design strip widths are based on the guidelines in NEHRP Seismic Design Technical Brief No. 7 Section 8. See Supplement No. 116.

15 May 2019
EDRT:
The comment response does not answer the question directly (i.e., are the results sensitive to the strip width). The provided reference is useful, but does not fully justify the proposed strip widths, as it simply discusses some general considerations and highlights some area of disagreement in code development. Also, this is a verification of an existing mat rather than a new design, which will require some sensitivity of the strip layout to the existing distribution of reinforcing, rather than a somewhat arbitrary strip width.
Is the layout of design strips from the original design known? This may be a better gage to understanding if certain mat areas are seeing higher loads due to the retrofit design. If it is not known, please provide an alternate strip layout that more closely follows the column bays, and report if this results in significantly less favorable D/C ratios.

7 June 2019
Simpson Gumpertz & Heger Inc.:
See the attached calculations for mat shear results considering narrower strips. DCRs in nearly all strips are well below 1.0. A few isolated strips have somewhat higher DCRs.

26 June 2019
EDRT:
Please justify the DCR acceptance criteria. The reported values of DCR up to 2.28 (pages 8 and 10 of supplement 116) are larger than what one would consider "somewhat higher" than 1.0. Related to this, please (1) provide a breakdown of the shear loads (D, L, E and J) and the design strengths for each strip, and (2) how the retrofit will increase the shear and flexural demands in the most critical portions of the mat (i.e. provide a side-by-side comparison of demands with and without the retrofit).. Also, (4) confirm whether the table of DCRs on pg. 8 is for the 'north' strips, since the headings in the left column refer to "west' strips, and (5) that the reference to "new east" in the figure on page 3 is a typo (seem it should be 'new west')

7 July 2019
Simpson Gumpertz & Heger Inc.:
The analysis using 10 ft strips was performed to understand the stress distribution in the mat foundation before and after the retrofit. The strips have a width equal to the mat depth and it is not likely that failure of the mat will occur over a single strip width. The calculations in Section

7.7 of Volume 3 show DCRs for more appropriate 25 ft strip widths, which are consistent with common design practice and with the recommendations of NEHRP Seismic Design Technical Brief No. 7.

1. The attached calculation "Supplement 116" includes breakdown of the loads and design strengths of each strip. .
2. The attached calculation "Supplement 116" includes a comparison of the factored shear and flexural demands and design strengths of each strip.
4. The DCRs on pg 7 of the attached "Supplement 116" are for the north strips. We have corrected the labels in these summary tables. We updated these summary tables below.
5. We have renamed the design strip in the figure on page 3 of the attached calculation "Supplement 116" below to "New West" and updated the figure below.

05 August 2019
EDRT:
Please confirm (1) that the calculated shears at the ed of the mat are consistent with the assumed load transfer into the new piles and (2) that the existing mat and the transfer into the mat extension can resist the induced shears. [Note - we assume that the third column on pg. 17 of supplement 16 should be labeled as "core south" rather than "core west"].

08 August 2019
Simpson Gumpertz & Heger Inc.:

1. Our prior calculations reported shears at the edge of the mat from a SAFE model which includes the perimeter basement walls and ground level slab. Additionally, it includes the mat extension which is present in all load cases including not only jacking but also dead and live loads. We studied load transfer from the new and existing piles into the strips of the mat extension and found that the perimeter basement walls (modeled linear elastic) acted as a composite cross section with the ground level slab, the existing mat, and the mat extension. These walls caused a major portion of the mat edge shears reported in our previous calculations. We reviewed the vertical forces exerted by these walls on each of the mat strips and found that some of those forces exceeded the tensile capacity of the vertical bars in the wall in these areas. We then recalibrated a stiffness modifier of 0.2 on the perimeter basement walls to limit the amount of this force to the yield capacity of the wall. We believe this results in more realistic estimates of the mat strip shears along the mat perimeter.

In addition to modifying the stiffness of the walls we also removed the mat extension from the model which we use to report gravity load stresses prior to jacking, since these forces will not be affected by the presence of the mat. This resulted in a redistribution of shears along the edge of the existing mat.

Finally, the edge of mat locations where we previously reported higher shear stresses were within a distance d from the tower columns. We are now reporting shear demand at a location d away from the column as permitted by ACI 7.4.3.2 and ACI 9.4.3.2. See page 9 of this document for further information on this change.

2. As previously discussed, the analysis using 10 ft strips was performed to better understand the stress distribution in the mat foundation before and after the retrofit. The adequacy of the mat is demonstrated in calculations shown in Volume 3, Section 7.7 where 25 ft strip widths, consistent with common design practice and with the recommendations of NEHRP Seismic Design Technical Brief No. 7 are used.

For EDRT's reference we updated the DCRs for the 10-foot strips with columns within d of the edge of mat as described above. The existing mat is checked for shear forces d away from the column toward the interior of the mat. The reduced demands at this location result in DCRs less than 1.0 for almost all strips of the existing mat and DCRs modestly exceeding 1.0 in a few strips. We previously checked the forces in the mat extension (see Volume 4).

Original Calcs Updated per Questions 1 and 2 from 05 August 2019

Title: Mat Slab Foundation One-Way Shear Capacity and Punching Shear

References: *ACI 318-14, Design Calculations from Desimone (05/2005), Design Drawing Documentation DIP 22 (03/2006), Mat Slab Core Strength Tests (08/25/2006, 09/20/2006), RFI No. 210 (5/2/2006 5/3/2006) Webcore Builders/DeSimone Consulting Engineers.*

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WEBCOR BUILDERS

Submitted To
Nic Rodrigues
DeSimone Consulting Engineers, PLLC
160 Sansome Street, Suite 1600
San Francisco, CA 94104

Submitted By
Spencer Sayles
WEBCOR BUILDERS
183 Fremont Street
San Francisco, CA 94105

Subject	Discipline	Originator RFI Number
Re-bar T-heads in Mat	Structural	

Cc: Company Name	Contact Name	Copies	Notes
Webcor Concrete Group	Greg Scott	PW	

Information Requested

This RFI is to confirm the shear reinforcing (vertical #14 with T-heads) will not need to extend into or beyond the lower mat reinforcing. Due to congestion, the lower T-heads will be allowed to rest on the top layer of the bottom mat. Please respond as quickly as possible as fabrication is being held until this answer is confirmed. Thank you.

Response

Nicolas Rodrigues
DeSimone
5-3-2006

Confirmed. T-heads can rest on the bottom mat of rebar.

Figure: RFI No. 210 stating as-built location of shear dowel reinforcement

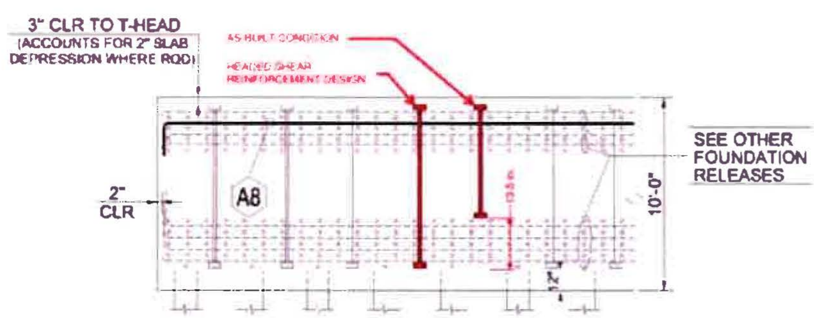


Figure: Illustration of as-built condition vs. design condition of shear dowel reinforcement

SIMPSON GUMPERTZ & HEGER Engineering of Structures and Building Enclosures	SUBJECT: Mat Slab Shear Capacity - 10' Strips	PROJECT NO: 140741.00 DATE: 8/7/2019 BY: SEB, SCD CHECKED BY: LH

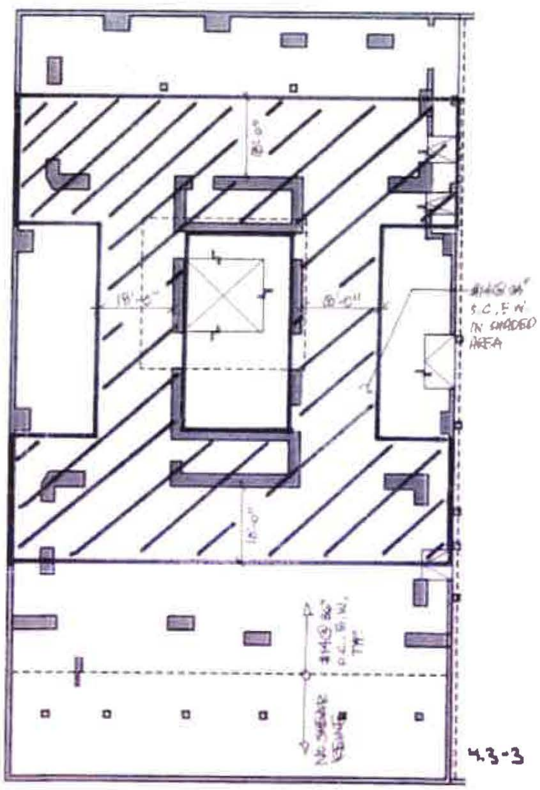
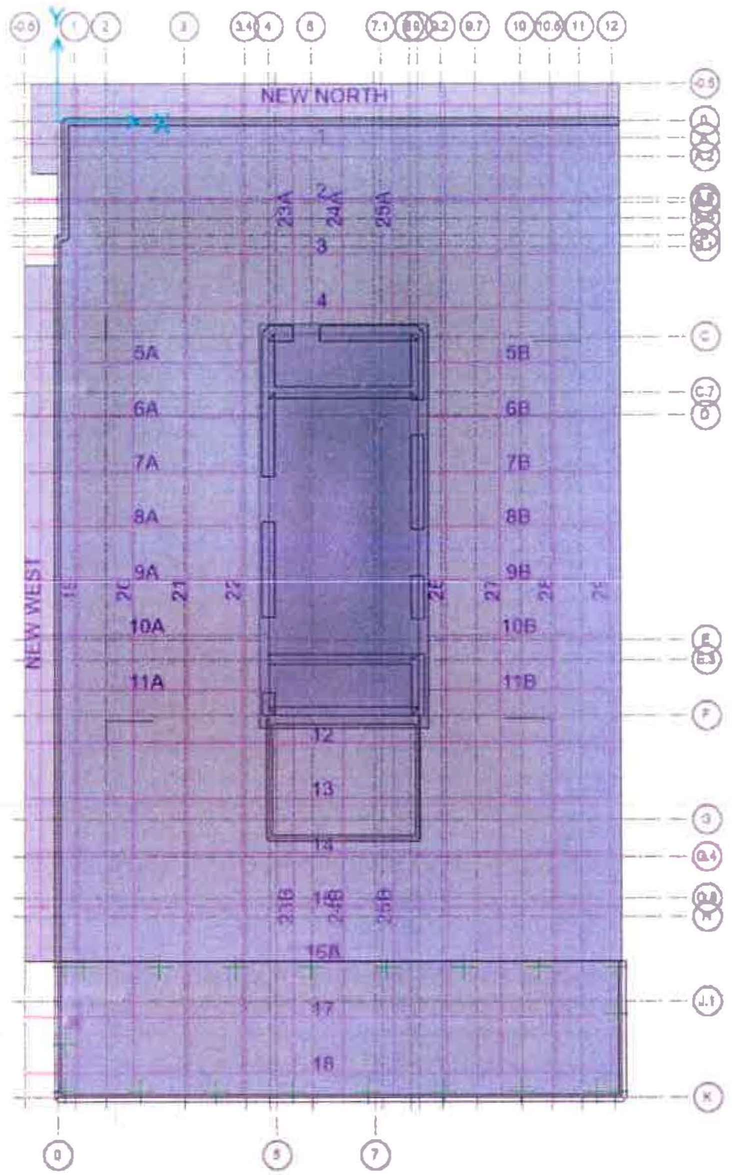


Figure: Shear Dowel Spacing Locations

SIMPSON GUMPERTZ & HEGER Engineering of Structures and Building Enclosures	SUBJECT: Mat Slab Shear Capacity - 10' Strips	PROJECT NO: 140741.00 DATE: 8/7/2019 BY: SEB, SCD CHECKED BY: LH

Design Strips:
- all design strips are 10ft wide



Material Properties:

Strength reduction factor for shear	$\phi_v := 0.75$
Yield Strength of No. 14 headed bars	$F_{y\_75} := 75ksi$
Yield Strength of Reinforcing Steel of No. 9 Pile Dowels	$F_y := 60ksi$
Strength of Concrete Estimated by ACI 301	$f'_c := 7155psi$
Diameter of #11 bar	$d_b := 1.41in$
Area of #11 bar	$a_b := 1.56in^2$
Diameter of #14 bar	$d_{b14} := 1.693in$
Area of #14 bar	$a_{b14} := 2.25in^2$
Diameter of #9 bar	$d_{b9} := 1.128in$
Area of #9 bar	$a_{b9} := 1.0in^2$

One-way Shear Capacity

depth to long. reinforcement $d := 120in - 12in - 1.41in \cdot 4 - 1in = 101.36 \cdot in$

Shear Strength from Concrete $V_c := 2\sqrt{f'_c \cdot psi} \cdot d = 205.77 \cdot \frac{kip}{ft}$

Concrete Strength @ 36" Slab $V_{c3ft} := 2\sqrt{f'_c \cdot psi} \cdot 31.5in = 63.95 \cdot \frac{kip}{ft}$

$d_s := d - 13.5in = 87.86 \cdot in$

Shear Reinforcement Area of #14 dowels $A_{v36\_14} := \frac{a_{b14}}{3ft} = 0.75 \cdot \frac{in^2}{ft}$

$A_{v24\_14} := \frac{a_{b14}}{2ft} = 1.13 \cdot \frac{in^2}{ft}$

Since #14 dowels do not extend to the full length of the mat foundation, #9 pile dowels are assumed as spliced with the #14 shear dowels. As such the reduced shear area of the #9 bars will be used instead.

Shear Reinforcement Area for #9 pile dowels over the pile spacing $A_{v36\_9} := \frac{4a_{b9}}{4.67ft} = 0.86 \cdot \frac{in^2}{ft}$

$A_{v24\_9} := \frac{4a_{b9}}{3.5ft} = 1.14 \cdot \frac{in^2}{ft}$

$V_{s36} := A_{v36\_9} \cdot F_y \cdot \frac{d_s}{56in} = 80.6 \cdot \frac{kip}{ft}$

$V_{s24} := A_{v24\_9} \cdot F_y \cdot \frac{d_s}{3.5ft} = 143.4 \cdot \frac{kip}{ft}$

Design shear capacity per unit foot of strip width $\phi V_{n36} := (V_c + V_{s36})\phi_v = 214.8 \cdot \frac{kip}{ft}$

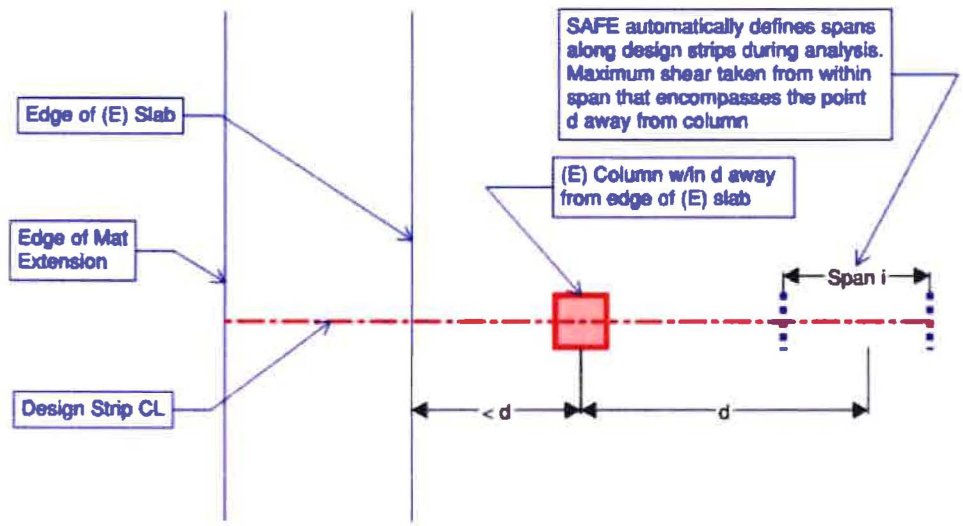
$\phi V_{n24} := (V_c + V_{s24})\phi_v = 261.91 \cdot \frac{kip}{ft}$

$\phi V_{n3ft} := \phi_v \cdot V_{c3ft} = 47.96 \cdot \frac{kip}{ft}$

Typical strip width is 10ft. $\phi V_{n36\_10ft} := \phi V_{n36} \cdot 10ft = 2148 \cdot kip$

$\phi V_{n24\_10ft} := \phi V_{n24} \cdot 10ft = 2619.11 \cdot kip$

Design strips with Columns less than d away from the edge of the mat:



Note: Forces d away to the west side of the column are accounted for in the design of the mat extension.

SIMPSON GUMPERTZ & HEGER Engineering of Structures and Building Enclosures	SUBJECT: Mat Slab Shear Capacity - 10' Strips	PROJECT NO: DATE: BY: CHECKED BY:	140741.00 8/7/2019 SEB, SCD LH

Design to Capacity ratios presented below represent the summation of the design values over the capacities at each critical section along the design strips.

Seismic Envelope for Strips 18 - 29

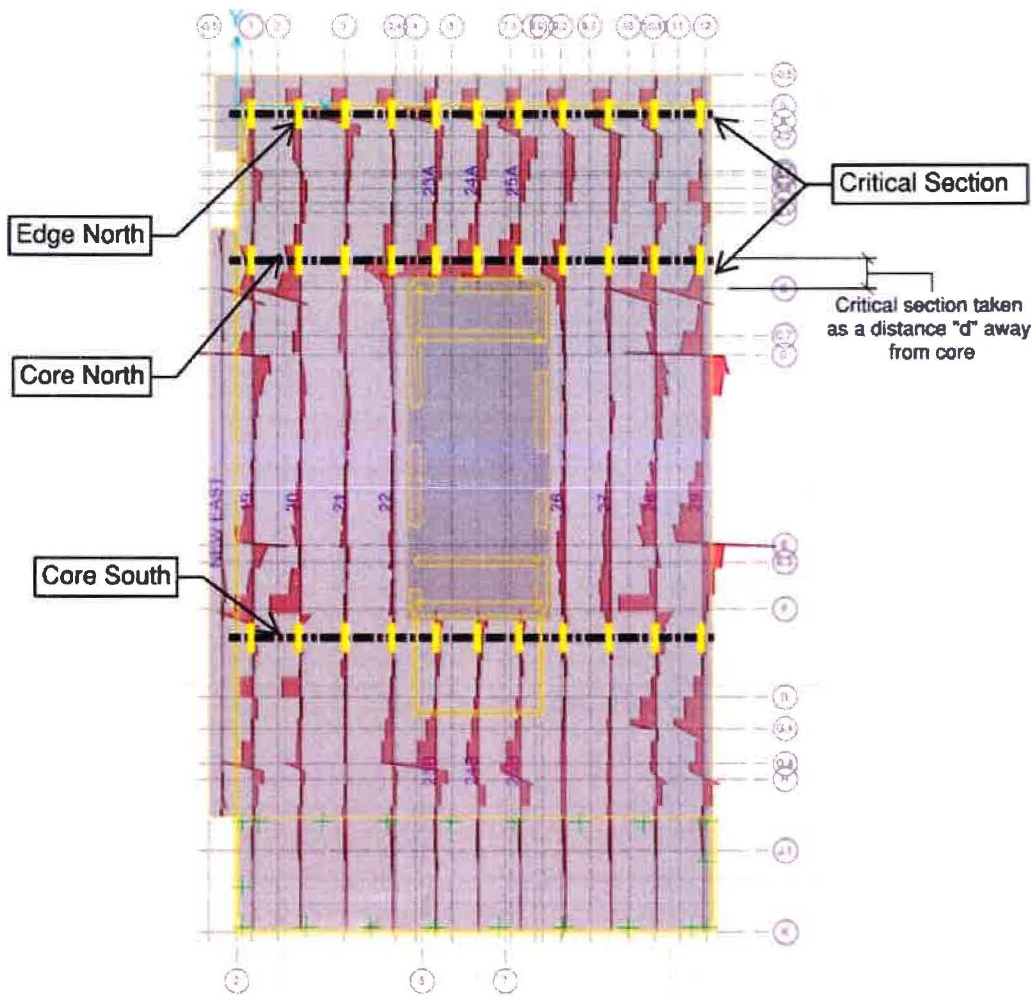


Table Output for Design Strips 19 - 29: DCR Taken per design strip

Envelope 0.7D + E + J

Span	19	20	21	22	23	24	25	26	27	28	29
Edge North	0.84	0.74	0.18	0.82	0.16	0.24	0.86	0.85	0.85	0.83	0.68
Core North	0.34	0.19	0.12	0.18	0.45	0.49	0.51	0.22	0.20	0.29	0.39
Core South	0.39	0.51	0.07	0.12	0.30	0.39	0.14	0.08	0.27	0.88	0.24

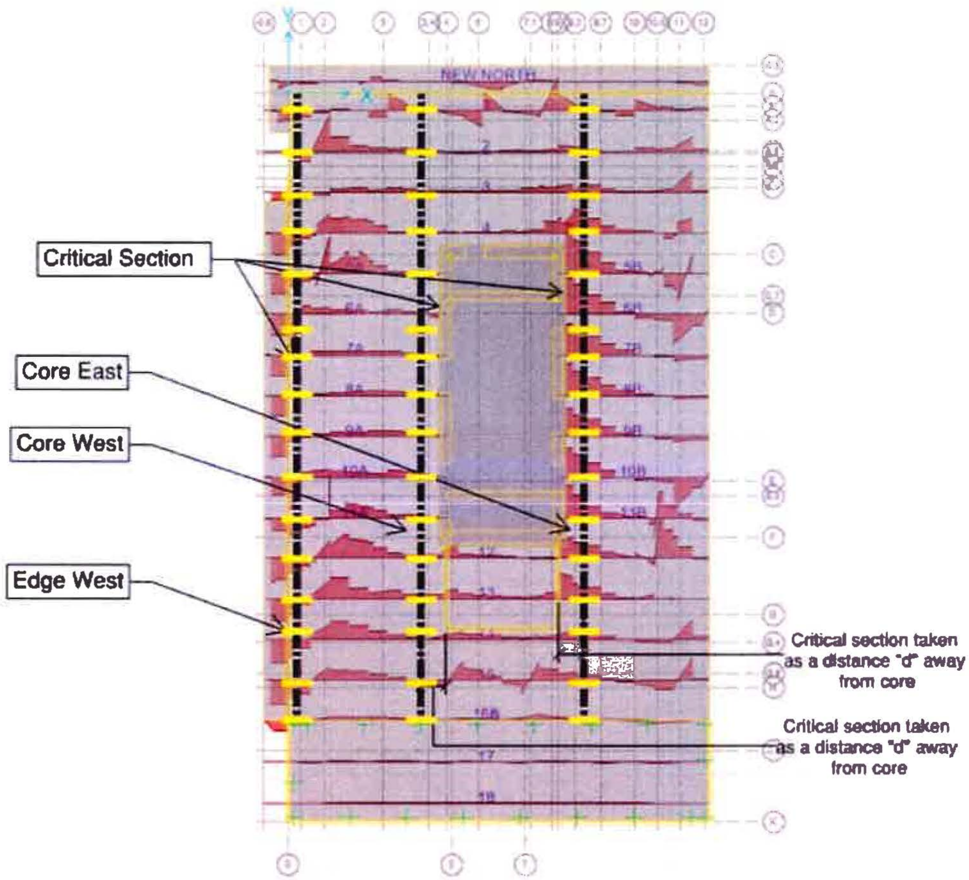
Envelope 1.4D + L + E + J

Span	19	20	21	22	23	24	25	26	27	28	29
Edge North	0.81	0.72	0.33	0.78	0.28	0.42	0.73	0.83	0.83	0.81	0.66
Core North	0.20	0.30	0.08	0.33	0.85	0.89	0.92	0.40	0.15	0.32	0.43
Core South	0.62	0.70	0.05	0.18	0.46	0.58	0.20	0.10	0.38	1.37	0.40

Note: Strips 21, 23A and 24A have a column within d from the north edge of the mat. Maximum shears are taken at d away from those colums.

SIMPSON GUMPERTZ & HEGER Engineering of Structures and Building Enclosures	SUBJECT: Mat Slab Shear Capacity - 10' Strips	PROJECT NO: 140741.00 DATE: 8/7/2019 BY: SEB, SCD CHECKED BY: LH

Seismic Envelope for Strips 1-16A



2019-06-05 One-Way Shear and Punching Shear.xmcd
Page 9

Simpson Gumpertz & Heger
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Table Output for Design Strips 1 - 16A: DCR Taken per design strip

Envelope 0.7D + E + J

Span	1	2	3	4	5	6	7	8	9	10
Edge West	0.55	0.72	0.71	0.69	0.72	0.17	0.80	0.79	0.78	0.23
Core West	0.22	0.11	0.12	0.19	0.46	0.40	0.41	0.33	0.30	0.24
Core East	0.21	0.16	0.24	0.49	0.67	0.61	0.59	0.56	0.53	0.47

Envelope 0.7D + E + J (Continued)

11	12	13	14	15	16A
0.79	0.88	0.96	0.89	0.92	0.96
0.25	0.17	0.14	0.11	0.08	0.20
0.37	0.36	0.07	0.25	0.19	0.17

Envelope 1.4D + L + E + J

Span	1	2	3	4	5	6	7	8	9	10
Edge West	0.44	0.62	0.45	0.68	0.84	0.30	0.78	0.77	0.75	0.44
Core West	0.32	0.14	0.05	0.36	0.83	0.73	0.75	0.63	0.58	0.48
Core East	0.27	0.25	0.39	0.77	1.11	0.98	0.93	0.87	0.81	0.73

Envelope 1.4D + L + E + J (continued)

11	12	13	14	15	16A
0.84	0.91	0.86	0.87	0.94	0.94
0.54	0.40	0.05	0.17	0.35	0.38
0.62	0.60	0.12	0.40	0.33	0.29

Note: Strips 6A and 10A have a column within d from the west edge of the mat. Maximum shears are taken at d away from those colums.

6/26/2019 Question 1 (Tables Revised for 08/05/2019 Questions)

We incrementally applied the Dead, Live, and Jacking loads to the model using nonlinear load cases that started from the end of the previous case. The results of that analysis are summarized in the tables below.

Strips 1-16A Incremental Shear Demands (kips)

Strip	Edge West				Core West				Core East			
	DL	DL + LL	DL + LL + Jacking	Capacity	DL	DL + LL	DL + LL + Jacking	Capacity	DL	DL + LL	DL + LL + Jacking	Capacity
1	75	83	875	1970	528	622	490	1970	455	622	376	1970
2	10	4	1224	2148	197	231	188	2148	339	231	294	2148
3	180	204	927	2148	224	266	3	2619	510	266	552	2619
4	269	311	1752	2619	1233	1426	507	2619	565	1426	1217	2619
5	403	465	1674	2553	2124	2453	1176	2553	1458	2453	1684	2553
6	733	852	649	2148	1638	1893	1029	2619	1294	1893	1501	2619
7	365	436	1684	2148	1522	1757	1021	2619	1240	1757	1474	2619
8	580	702	1674	2148	1336	1546	823	2619	1186	1546	1414	2619
9	242	315	1640	2148	1296	1501	709	2619	1111	1501	1322	2619
10	638	746	698	2148	1391	1610	513	2619	969	1610	1153	2619
11	108	135	1773	2553	1427	1649	590	2553	829	1649	1011	2553
12	239	276	1870	2619	1138	1317	507	2619	242	1317	1002	2619
13	615	722	1852	2148	341	396	68	2619	92	396	59	2619
14	444	518	1874	2148	726	853	124	2148	217	853	544	2148
15	681	791	1960	2148	1190	1416	482	2148	160	1416	538	2148
16A	178	206	947	1003	338	401	266	1003	365	401	240	1003

Strips 19-29 Incremental Shear Demands (kips)

Strip	Edge North				Core North				Core South			
	DL	DL + LL	DL + LL + Jacking	Capacity	DL	DL + LL	DL + LL + Jacking	Capacity	DL	DL + LL	DL + LL + Jacking	Capacity
19	142	165	1568	1897	963	1105	186	1897	77	69	608	1897
20	50	53	1576	2148	920	1059	228	2148	22	14	757	2148
21	548	649	422	2148	351	410	25	2619	50	53	32	2619
22	672	805	1707	2148	1710	1980	460	2619	479	553	247	2619
23	358	432	338	1957	1959	2267	1054	2387	479	556	522	2387
24	408	494	557	1955	2126	2459	1112	2383	609	705	735	2383
25	1222	1471	1405	1957	2109	2437	1110	2387	199	235	248	2387
26	281	334	1816	2148	1457	1684	489	2619	307	368	106	2619
27	836	966	1813	2148	212	242	257	2619	371	429	406	2619
28	204	241	1761	2148	756	860	466	2148	372	420	1570	2148
29	136	152	1041	1559	744	846	437	1559	36	31	371	1559

SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures

PROJECT NAME: 301 Mission Street Perimeter Pile Upgrade
DATE: 9 August-2019 ENGINEER: SCD
SUBJECT: Supplement No. 116

6/26/2019 Question 2 (Tables Revised for 08/05/2019 Questions)

We ran the SAFE analysis without jacking loads applied to determine the demands in the existing condition. We have summarized the demands with (retrofit) and without (existing) jacking loads applied in the tables below.

Strips 1-16A Shear Demands (kips)

Strip	Edge West					Core West					Core East				
	Envelope 0.7D + E + J		Envelope 1.4D + L + E + J		Capacity	Envelope 0.7D + E + J		Envelope 1.4D + L + E + J		Capacity	Envelope 0.7D + E + J		Envelope 1.4D + L + E + J		Capacity
	Existing	Retrofit	Existing	Retrofit		Existing	Retrofit	Existing	Retrofit		Existing	Retrofit	Existing	Retrofit	
1	101	1082	145	863	1970	466	433	916	623	1970	458	433	745	542	1970
2	52	1543	66	1337	2148	215	231	357	308	2148	355	231	597	529	2148
3	191	1520	337	977	2148	273	309	582	119	2619	604	309	1100	1020	2619
4	504	1806	665	1772	2619	1525	485	2476	940	2619	580	485	1187	2026	2619
5	514	1848	861	2137	2553	2590	1162	4138	2129	2553	1701	1162	2874	2828	2553
6	577	375	983	642	2148	2023	1054	3229	1912	2619	1570	1054	2604	2578	2619
7	322	1710	624	1667	2148	1863	1079	2986	1955	2619	1518	1079	2452	2447	2619
8	509	1699	990	1652	2148	1736	857	2699	1652	2619	1422	857	2281	2270	2619
9	242	1676	681	1621	2148	1779	787	2718	1529	2619	1349	787	2149	2130	2619
10	546	491	895	951	2148	1810	636	2843	1266	2619	1187	636	1933	1918	2619
11	241	2014	431	2132	2553	1794	644	2893	1370	2553	892	644	1589	1578	2553
12	536	2300	700	2392	2619	1474	434	2382	1059	2619	472	434	734	1571	2619
13	910	2054	1432	1858	2148	332	362	611	136	2619	227	362	317	315	2619
14	636	1916	1005	1868	2148	636	233	1143	372	2148	256	233	504	851	2148
15	720	1982	1316	2017	2148	891	169	1801	759	2148	156	169	386	718	2148
16A	160	961	254	938	1003	249	204	495	379	1003	355	204	584	292	1003

Strips 1-16A Flexure Demands (kip-ft)

Strip	Edge West					Core West					Core East				
	Envelope 0.7D + E + J		Envelope 1.4D + L + E + J		Capacity	Envelope 0.7D + E + J		Envelope 1.4D + L + E + J		Capacity	Envelope 0.7D + E + J		Envelope 1.4D + L + E + J		Capacity
	Existing	Retrofit	Existing	Retrofit		Existing	Retrofit	Existing	Retrofit		Existing	Retrofit	Existing	Retrofit	
1	307	9536	480	10546	40567	3687	6945	4591	4503	25654	3235	6945	5199	5142	25654
2	209	13004	249	14428	40567	3150	9132	6600	4113	25654	7198	9132	10863	8969	25654
3	199	6734	313	5667	50309	6585	7045	11500	3879	25654	10226	7045	14704	14857	25654
4	1020	12239	951	11949	50309	6559	6699	7532	10558	25654	14734	6699	26187	19366	25654
5	805	13502	1744	15191	50309	6971	5294	7639	8511	25654	9499	5294	16551	17336	25654
6	1560	8952	4583	7698	20603	7893	7953	6825	5783	78577	9402	7953	13627	14436	78577
7	1493	13841	3301	16280	20603	8628	9881	8276	7477	78577	10865	9881	12021	12534	78577
8	1601	9658	2650	7833	20603	8767	9179	8438	6131	78577	10317	9179	12346	12523	78577
9	2456	13513	4860	14438	20603	8116	8945	8687	5687	78577	10543	8945	11443	11698	78577
10	1235	8557	3012	6582	20603	7416	8242	6903	3761	78577	9930	8242	11586	11709	78577
11	990	11288	2088	13478	50309	7166	7822	6694	7155	78577	10204	7822	13484	13623	78577
12	1192	10081	1711	9215	50309	8419	8514	11015	12779	78577	10592	8514	15658	15609	78577
13	2648	12229	3916	11480	50309	9472	8803	11693	8270	78577	2112	8803	3590	3680	78577
14	2211	12838	3609	11503	30665	6899	7819	7998	5677	20603	11855	7819	14391	14635	20603
15	2064	12266	3410	11448	30665	6066	7094	6811	5001	20603	11807	7094	15613	14091	20603
16A	1960	6144	3298	6094	30665	2360	4718	3586	3191	20603	7392	4718	7410	7490	20603

Strips 19-29 Shear Demands (kips)

Strip	Edge North					Core North					Core South				
	Envelope 0.7D + E + J		Envelope 1.4D + L + E + J		Capacity	Envelope 0.7D + E + J		Envelope 1.4D + L + E + J		Capacity	Envelope 0.7D + E + J		Envelope 1.4D + L + E + J		Capacity
	Existing	Retrofit	Existing	Retrofit		Existing	Retrofit	Existing	Retrofit		Existing	Retrofit	Existing	Retrofit	
19	253	1594	281	1537	1897	1453	642	2108	387	1897	266	742	300	1177	1897
20	184	1598	182	1548	2148	1467	410	2081	644	2148	239	1091	217	1496	2148
21	530	377	784	699	2148	480	327	736	208	2619	158	184	187	140	2619
22	580	1766	896	1679	2148	2172	466	3335	877	2619	686	325	987	475	2619
23	352	305	427	542	1957	2487	1080	3822	2025	2387	735	711	1109	1102	2387
24	393	464	528	824	1955	2690	1157	4155	2131	2383	893	930	1349	1377	2383
25	1235	1675	2165	1423	1957	2676	1224	4139	2190	2387	322	340	463	477	2387
26	284	1832	576	1792	2148	1862	583	2955	1059	2619	461	199	667	268	2619
27	867	1833	1497	1785	2148	333	513	571	380	2619	682	712	963	990	2619
28	277	1783	419	1730	2148	1156	617	1988	684	2148	611	1893	897	2951	2148
29	183	1059	297	1022	1559	939	600	1721	664	1559	110	374	144	617	1559

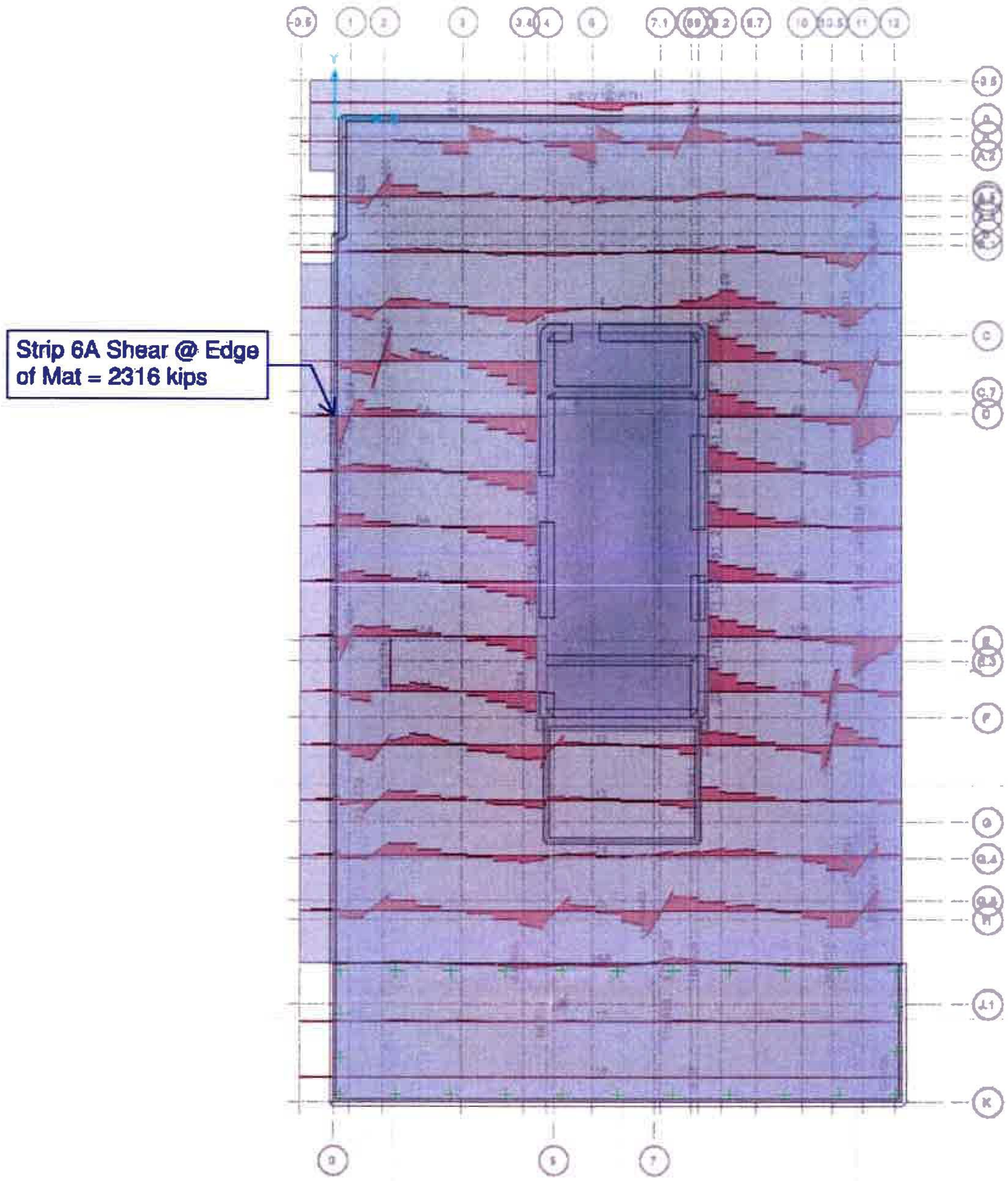
Strips 19-29 Flexure Demands (kip-ft)

Strip	Edge North					Core North					Core South				
	Envelope 0.7D + E + J		Envelope 1.4D + L + E + J		Capacity	Envelope 0.7D + E + J		Envelope 1.4D + L + E + J		Capacity	Envelope 0.7D + E + J		Envelope 1.4D + L + E + J		Capacity
	Existing	Retrofit	Existing	Retrofit		Existing	Retrofit	Existing	Retrofit		Existing	Retrofit	Existing	Retrofit	
19	487	11035	729	8469	40567	6292	14980	10401	10396	102385	7072	9143	9506	9076	102385
20	996	10980	2166	11366	40567	6229	9250	9403	2568	102385	5162	11212	5775	10913	102385
21	1778	11594	4073	10642	40567	6463	9501	10102	6104	102385	4738	4708	6241	4591	102385
22	1836	14098	3144	15339	40567	9894	10188	9582	6591	102385	6136	6448	11153	10411	102385
23	936	12517	1893	11941	40567	10436	12335	13696	10199	102385	7410	7654	9739	10258	102385
24	852	13976	1345	14042	40567	10118	12426	13047	9975	102385	6725	7596	7960	8756	102385
25	1689	7328	3736	5537	40567	10659	11872	13386	8862	102385	6871	7484	6934	7451	102385
26	1342	12853	2252	14017	40567	9286	8760	10104	5183	102385	8778	7208	10381	7846	102385
27	2346	13533	4292	11669	40567	5164	8186	8158	3965	102385	5306	5339	5150	5265	102385
28	547	12604	1537	11608	40567	6120	7718	7231	4854	102385	8536	8005	16274	12976	102385
29	759	9475	1391	8019	40567	6751	7066	10159	5405	102385	8130	8509	15061	14422	102385

8/05/2019 Question 1

We compare the shear at the edge of the mat with the mat extension and the walls removed. The walls provided significant ability to transfer shear load along the edge of the mat. Based on this study, we assigned membrane property modifiers of 0.2 for the foundation walls.

Model with reduced membrane property modifiers Strip Shear Demand due to Dead + Live Loads



Model with reduced membrane property modifiers and no mat extension modeled
Strip Shear Demand due to Dead + Live Loads