

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	231 di 288

555	ok Av	7.42	0.25	0.13	8.4	4.3	702.7	355.6
556	ok Av	5.99	0.20	0.02	6.8	0.7	564.6	56.9
557	ok Av	7.44	0.25	0.13	8.4	4.3	703.7	356.0
558	ok Av	9.56	0.32	0.13	10.7	4.5	892.6	372.5
559	ok Av	13.93	0.30	0.37	9.9	12.4	825.2	1033.7
560	ok Av	11.93	0.18	0.37	6.1	12.2	506.5	1020.2
561	ok	3.40						
562	ok	3.47						
563	ok	3.08						
564	ok Av	6.86	0.23	0.08	7.5	2.7	625.3	223.8
565	ok Av	7.71	0.26	0.08	8.5	2.7	711.2	222.1
566	ok Av	5.89	0.20	0.03	6.7	0.9	557.1	74.4
567	ok Av	5.09	0.17	0.02	5.7	0.7	478.3	62.0
568	ok Av	5.88	0.20	0.03	6.7	0.9	556.4	75.7
569	ok Av	7.71	0.26	0.08	8.5	2.7	711.1	222.1
570	ok Av	6.85	0.23	0.08	7.5	2.7	623.7	224.1
571	ok	3.48						
572	ok	3.10						
573	ok Av	5.88	0.20	0.05	6.5	1.6	545.0	133.5
574	ok	3.09						
575	ok Av	4.35	0.15	0.05	4.9	1.5	405.3	128.7
576	ok Av	9.13	0.28	0.14	9.3	4.6	779.5	380.6
577	ok Av	5.32	0.18	0.09	5.9	3.0	492.6	251.4
578	ok Av	6.00	0.20	0.02	6.8	0.8	564.3	68.2
579	ok Av	5.33	0.18	0.09	5.9	3.0	492.2	253.2
580	ok Av	9.13	0.28	0.14	9.3	4.6	778.3	381.9
581	ok Av	4.34	0.15	0.05	4.8	1.6	403.9	129.8
582	ok Av	5.86	0.20	0.05	6.5	1.6	543.0	132.6
583	ok	3.05						
584	ok Av	8.77	0.23	0.20	7.6	6.5	631.7	540.2
585	ok	3.48						
586	ok Av	5.18	0.09	0.16	3.0	5.4	250.3	451.2
587	ok	2.41						
588	ok Av	4.04	0.10	0.10	3.4	3.4	287.2	280.9
589	ok Av	7.75	0.23	0.13	7.6	4.5	632.1	372.9
590	ok Av	4.05	0.10	0.10	3.5	3.4	287.8	282.8
591	ok	2.43						
592	ok Av	5.19	0.09	0.16	3.0	5.4	250.8	452.5
593	ok Av	8.76	0.23	0.20	7.6	6.5	629.8	541.0
594	ok	3.49						
595	ok	3.49						
596	ok	2.19						

Nodo	Max tau	Ver V pr	Ver V sec	Af V pr	Af V sec	V pr	V sec
	13.93	0.34	0.37	11.22	12.40	935.71	1033.72

Macro Guscio	Spessore	d Materiale	d Criterio	Progettazione
	cm			
3	100.00	5	1	Singolo elemento

Nodo	Stato	x/d	V N/M	ver. rid	Af pr-	Af pr+	Af sec-	Af sec+	N x	N y	N xy	M x	M y	M xy
									daN/cm	daN/cm	daN/cm	daN	daN	daN
133	ok	0.04	2.95e-02	1.82e-03	15.7	15.7	15.7	15.7	16.4	17.3	-17.7	505.7	299.6	-1250.4
134	ok	0.04	4.66e-02	4.30e-03	15.7	15.7	15.7	15.7	16.7	17.7	-33.2	1853.0	1189.5	-1019.3
135	ok	0.04	8.36e-02	5.99e-03	15.7	15.7	15.7	15.7	27.3	-22.1	67.3	-4225.5	-2175.6	1302.6
136	ok	0.04	5.19e-02	4.67e-03	15.7	15.7	15.7	15.7	-18.8	-22.8	49.6	-2326.1	-1739.7	768.2
137	ok	0.04	5.72e-02	7.35e-03	15.7	15.7	15.7	15.7	40.7	91.8	12.4	-1500.8	-2962.0	-395.9
138	ok	0.04	0.1	1.30e-02	15.7	15.7	15.7	15.7	-36.0	-126.3	107.4	4203.2	2924.3	4403.2
139	ok	0.04	0.1	1.52e-02	15.7	15.7	15.7	15.7	-0.7	78.6	-30.2	-248.0	-6014.1	-1945.0
140	ok	0.04	0.1	1.30e-02	15.7	15.7	15.7	15.7	-0.7	65.3	-94.9	-5140.2	-4541.0	-2253.8
141	ok	0.04	0.2	1.69e-02	15.7	15.7	15.7	15.7	83.9	137.7	-62.7	-4216.8	-9495.0	1652.8
142	ok	0.04	0.1	1.25e-02	15.7	15.7	15.7	15.7	-5.7	-6.9	-9.7	2050.7	-6920.0	-3848.5
143	ok	0.04	8.41e-02	1.60e-02	15.7	15.7	15.7	15.7	-1.8	-224.7	4.3	-751.9	-4671.1	-1060.9
144	ok	0.04	0.1	1.09e-02	15.7	15.7	15.7	15.7	55.0	-17.9	44.8	-521.5	-6120.2	664.4
145	ok	0.04	0.2	1.69e-02	15.7	15.7	15.7	15.7	85.3	134.7	64.0	-4265.4	-9437.9	-1692.2
146	ok	0.04	0.1	1.24e-02	15.7	15.7	15.7	15.7	69.8	73.5	-46.2	-4571.4	-3605.4	-3468.6
147	ok	0.04	0.1	1.53e-02	15.7	15.7	15.7	15.7	-1.4	76.0	30.2	-236.8	-5993.6	1953.4
148	ok	0.04	0.1	1.30e-02	15.7	15.7	15.7	15.7	-1.7	66.4	96.2	-5092.4	-4560.1	2224.4
149	ok	0.04	5.53e-02	7.54e-03	15.7	15.7	15.7	15.7	48.0	25.7	-23.2	-1657.1	-1648.5	-916.2
150	ok	0.04	0.1	1.30e-02	15.7	15.7	15.7	15.7	46.1	87.8	113.8	-4489.7	-3812.2	2337.3
151	ok	0.04	4.50e-02	4.33e-03	15.7	15.7	15.7	15.7	-14.0	40.5	-38.4	-1873.9	-1825.0	-356.0
152	ok	0.04	8.70e-02	5.98e-03	15.7	15.7	15.7	15.7	32.1	-31.1	-47.0	-4471.9	-1194.4	-1479.1

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153	ok	0.04	2.95e-02	1.86e-03	15.7	15.7	15.7	15.7	17.8	16.4	18.6	451.0	340.7	1261.6
154	ok	0.04	5.22e-02	4.63e-03	15.7	15.7	15.7	15.7	-15.3	-23.6	-51.1	-2394.2	-1476.7	-651.0
155	ok	0.04	0.2	8.82e-03	15.7	15.7	15.7	15.7	19.9	50.6	-61.1	-4917.4	-2932.8	-4729.1
156	ok	0.04	0.2	1.18e-02	15.7	15.7	15.7	15.7	102.0	25.8	-33.6	-1.037e+04	-1627.4	834.6
157	ok	0.04	0.2	1.13e-02	15.7	15.7	15.7	15.7	30.1	53.2	-66.8	-4871.9	-4215.0	-4219.4
158	ok	0.04	0.2	1.77e-02	15.7	15.7	15.7	15.7	-184.1	52.1	-126.0	-5449.4	-3187.6	-766.6
159	ok	0.04	0.2	1.91e-02	15.7	15.7	15.7	15.7	-231.6	60.1	-57.4	-6452.8	-4696.7	5009.5
160	ok	0.04	0.2	1.57e-02	15.7	15.7	15.7	15.7	-205.4	78.1	52.8	-1.037e+04	-6250.7	-3751.4
161	ok	0.04	0.2	1.92e-02	15.7	15.7	15.7	15.7	-5.8	95.4	26.7	-6711.8	-4340.6	-4143.8
162	ok	0.04	0.2	1.77e-02	15.7	15.7	15.7	15.7	211.4	-43.8	-99.5	4845.1	-2538.8	-2881.1
163	ok	0.04	0.2	1.14e-02	15.7	15.7	15.7	15.7	31.5	55.4	65.7	-4905.8	-4312.4	4274.8
164	ok	0.04	0.2	8.91e-03	15.7	15.7	15.7	15.7	14.7	66.4	20.5	-6055.5	-3851.4	-2634.0
165	ok	0.04	0.2	1.19e-02	15.7	15.7	15.7	15.7	115.0	29.6	27.5	-1.093e+04	-1814.7	-528.8
166	ok	0.04	0.2	1.41e-02	15.7	15.7	15.7	15.7	66.1	30.1	-25.1	-1.110e+04	-7223.3	-33.5
167	ok	0.04	0.3	9.21e-03	15.7	15.7	15.7	15.7	142.7	98.5	-52.0	-1.360e+04	-5965.5	3166.4
168	ok	0.04	0.2	1.90e-02	15.7	15.7	15.7	15.7	-96.8	-2.4	-29.8	-8560.6	-8270.9	1591.6
169	ok	0.04	0.5	1.72e-02	15.7	15.7	15.7	15.7	-129.3	-38.9	-70.4	-2.711e+04	-7607.9	-3404.0
170	ok	0.04	0.4	2.94e-02	15.7	15.7	15.7	15.7	-302.8	81.3	-98.0	-1.740e+04	-1.013e+04	-1743.1
171	ok	0.04	0.4	2.18e-02	15.7	15.7	15.7	15.7	-279.5	78.2	112.0	-2.086e+04	-1.066e+04	1790.1
172	ok	0.04	0.4	2.92e-02	15.7	15.7	15.7	15.7	-330.0	-70.0	90.3	-1.686e+04	-6201.2	5224.8
173	ok	0.04	0.5	1.70e-02	15.7	15.7	15.7	15.7	-126.2	-38.4	71.5	-2.714e+04	-7636.0	3395.8
174	ok	0.04	0.2	1.88e-02	15.7	15.7	15.7	15.7	-92.2	0.5	29.0	-8788.7	-8388.4	-1572.5
175	ok	0.04	0.2	1.41e-02	15.7	15.7	15.7	15.7	70.1	32.0	22.7	-1.127e+04	-7284.5	123.8
176	ok	0.04	0.3	9.46e-03	15.7	15.7	15.7	15.7	151.4	99.6	56.4	-1.398e+04	-6038.1	-3363.6
177	ok	0.04	0.2	1.65e-02	15.7	15.7	15.7	15.7	51.5	-21.7	49.3	-1.117e+04	-3830.5	406.8
178	ok	0.04	0.1	8.48e-03	15.7	15.7	15.7	15.7	-53.5	-22.9	14.5	-5198.0	1476.9	-3207.5
179	ok	0.04	0.4	2.27e-02	15.7	15.7	15.7	15.7	-144.8	-41.1	24.0	-1.738e+04	-1.966e+04	4186.7
180	ok	0.04	0.6	2.21e-02	15.7	15.7	15.7	15.7	-207.1	-60.7	87.6	-3.731e+04	-1.411e+04	1.193e+04
181	ok	0.05	0.4	6.34e-02	15.7	19.4	15.7	22.2	-243.6	-926.4	190.4	-1.948e+04	-1.799e+04	4683.5
182	ok	0.05	0.4	6.50e-02	15.7	21.3	15.7	24.2	-439.6	-358.8	107.9	-2.884e+04	-1.222e+04	2155.9
183	ok	0.05	0.4	6.34e-02	15.7	19.5	15.7	22.2	-464.3	-374.9	-73.5	-2.581e+04	-1.140e+04	-3636.6
184	ok	0.04	0.6	2.20e-02	15.7	15.7	15.7	15.7	-213.0	-60.6	-85.0	-3.724e+04	-1.416e+04	-1.195e+04
185	ok	0.04	0.4	2.27e-02	15.7	15.7	15.7	15.7	-252.8	-34.7	-60.6	-1.557e+04	-1.014e+04	-1.175e+04
186	ok	0.04	0.2	1.65e-02	15.7	15.7	15.7	15.7	146.8	16.7	-138.1	-9811.7	-1467.4	-2903.4
187	ok	0.04	0.1	8.44e-03	15.7	15.7	15.7	15.7	-49.4	-24.0	-12.9	-5299.1	1522.8	3113.3
188	ok	0.04	0.2	1.35e-02	15.7	15.7	15.7	15.7	35.4	17.1	47.6	-1.200e+04	-7412.9	923.7
189	ok	0.04	0.3	6.67e-03	15.7	15.7	15.7	15.7	164.3	111.5	90.9	-1.269e+04	-6310.2	-4046.2
190	ok	0.04	0.2	2.04e-02	15.7	15.7	15.7	15.7	-136.8	12.0	47.6	-1.130e+04	-9843.6	167.1
191	ok	0.04	0.5	2.23e-02	15.7	15.7	15.7	15.7	-195.2	-16.6	114.9	-3.079e+04	-8312.7	3416.6
192	ok	0.04	0.3	3.02e-02	15.7	15.7	15.7	15.7	-406.0	-62.1	64.1	-2.005e+04	-6906.4	6203.2
193	ok	0.04	0.4	2.31e-02	15.7	15.7	15.7	15.7	-336.4	95.5	-78.2	-2.444e+04	-1.190e+04	-2025.7
194	ok	0.04	0.3	3.03e-02	15.7	15.7	15.7	15.7	-383.8	109.3	-109.4	-2.051e+04	-1.196e+04	-1478.4
195	ok	0.04	0.5	2.23e-02	15.7	15.7	15.7	15.7	-197.0	-15.4	-113.3	-3.078e+04	-8366.8	-3444.2
196	ok	0.04	0.2	2.05e-02	15.7	15.7	15.7	15.7	-250.7	-24.0	-136.9	-1.077e+04	-6458.5	-2801.6
197	ok	0.04	0.2	1.35e-02	15.7	15.7	15.7	15.7	59.0	61.9	-16.0	-1.204e+04	-5309.2	1513.1
198	ok	0.04	0.3	6.70e-03	15.7	15.7	15.7	15.7	166.9	112.0	-91.5	-1.279e+04	-6325.9	4096.9
199	ok	0.04	0.2	6.73e-03	15.7	15.7	15.7	15.7	2.7	-52.6	-56.2	-4486.5	1370.6	-4366.8
200	ok	0.04	0.2	1.06e-02	15.7	15.7	15.7	15.7	93.0	-9.6	42.9	-8274.0	-555.4	-849.2
201	ok	0.04	0.2	1.60e-02	15.7	15.7	15.7	15.7	48.0	74.8	64.2	-6520.9	-5059.1	6382.2
202	ok	0.04	0.1	1.93e-02	15.7	15.7	15.7	15.7	-27.6	52.1	105.6	-5679.9	-2406.9	3195.7
203	ok	0.04	0.3	2.20e-02	15.7	15.7	15.7	15.7	95.3	125.3	38.1	-7978.8	-6092.7	-6457.6
204	ok	0.04	0.3	1.63e-02	15.7	15.7	15.7	15.7	-238.7	55.0	58.6	-1.197e+04	-5751.4	1198.2
205	ok	0.04	0.3	2.19e-02	15.7	15.7	15.7	15.7	95.5	124.0	-37.3	-7977.1	-5982.4	6477.7
206	ok	0.04	0.1	1.93e-02	15.7	15.7	15.7	15.7	-9.9	7.3	-78.2	-4228.5	-4995.4	-2587.3
207	ok	0.04	0.2	1.59e-02	15.7	15.7	15.7	15.7	47.8	74.6	-64.4	-6535.8	-5042.6	-6360.3
208	ok	0.04	0.2	6.71e-03	15.7	15.7	15.7	15.7	11.8	11.1	-36.5	-6963.1	-3968.7	-1837.8
209	ok	0.04	0.2	1.07e-02	15.7	15.7	15.7	15.7	95.0	-9.3	-41.6	-8374.1	-584.7	800.9
210	ok	0.04	0.1	6.08e-03	15.7	15.7	15.7	15.7	-22.4	19.1	50.1	5240.0	3302.3	1064.4
211	ok	0.04	4.52e-02	4.88e-03	15.7	15.7	15.7	15.7	-32.8	-24.9	-36.1	-1392.4	-1513.2	-775.9
212	ok	0.04	0.1	1.16e-02	15.7	15.7	15.7	15.7	35.0	104.1	118.3	-4004.2	-4276.2	3202.4
213	ok	0.04	0.1	9.49e-03	15.7	15.7	15.7	15.7	-12.2	96.2	123.2	-5978.4	-5440.8	1886.7
214	ok	0.04	0.2	1.02e-02	15.7	15.7	15.7	15.7	75.0	105.1	8.8	-4865.6	-5212.1	-3463.8
215	ok	0.04	0.1	1.13e-02	15.7	15.7	15.7	15.7	-4.2	124.4	16.1	324.1	-6009.7	1062.5
216	ok	0.04	0.2	1.03e-02	15.7	15.7	15.7	15.7	-34.9	37.5	19.2	2336.0	-7446.6	-3723.5
217	ok	0.04	0.1	9.52e-03	15.7	15.7	15.7	15.7	-11.7	96.5	-122.5	-5998.2	-5446.8	-1896.9
218	ok	0.04	0.1	1.16e-02	15.7	15.7	15.7	15.7	35.1	104.3	-118.6	-3997.8	-4283.8	-3179.5
219	ok	0.04	0.1	6.06e-03	15.7	15.7	15.7	15.7	-21.6	19.2	-50.3	5271.5	3333.5	-1131.7
220	ok	0.04	4.66e-02	4.85e-03	15.7	15.7	15.7	15.7	10.1	23.5	-49.9	2108.0	1504.6	-455.3
221	ok	0.04	4.46e-02	4.38e-03	15.7	15.7	15.7	15.7	11.9	26.2	34.6	1506.0	1479.0	684.0
222	ok	0.04	3.55e-02	2.27e-03	15.7	15.7	15.7	15.7	-18.4	-16.0	-17.2	-77.0	-98.2	-1229.3
223	ok	0.04	8.79e-02	7.83e-03	15.7	15.7	15.7	15.7	24.4	85.8	24.5	-528.5	-4599.4	529.9
224	ok	0.04	0.1	1.40e-02	15.7	15.7	15.7	15.7	0.9	89.4	28.5	-710.9	-5553.4	1012.7
225	ok	0.04	0.2	1.39e-02	15.7	15.7	15.7	15.7	77.1	216.1	54.4	-4298.1	-9635.8	-2323.6
226	ok	0.04	7.83e-02	1.28e-02	15.7	15.7	15.7	15.7	-3.2	-23.3	-19.8	-342.5	-3382.7	33.9
227	ok	0.04	0.2	1.39e-02	15.7	15.7	15.7	15.7	77.8	217.6	-54.6	-4323.7	-9662.5	2344.5
228	ok	0.04	0.1	1.39e-02	15.7	15.7	15.7	15.7	-2.3	156.4	-16.3	-435.6	-6893.9	-2094.6
229	ok	0.04	8.90e-02	7.67e-03	15.7	15.7	15.7	15.7	12.6	119.0	-43.7	-228.9	-3019.0	-749.4

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433	I-1	B_1	519_v3	1	233 di 288

230	ok	0.04	4.51e-02	4.36e-03	15.7	15.7	15.7	15.7	-5.9	15.2	-11.1	1272.8	481.5	-689.6
231	ok	0.04	3.55e-02	2.27e-03	15.7	15.7	15.7	15.7	12.4	16.2	-10.6	550.1	450.3	-1319.2

Nodo	x/d	V N/M	ver. rid	Af pr-	Af pr+	Af sec-	Af sec+	N x	N y	N xy	M x	M y	M xy
	0.05	0.62	0.06	15.71	21.30	15.71	24.19	-464.35	-926.38	-138.09	-3.731e+04	-1.966e+04	-1.195e+04
								211.36	217.56	190.39	5271.47	3333.53	1.193e+04

Nodo	Stato	Max tau daN/cm2	Ver V pr	Ver V sec	Af V pr	Af V sec	V pr daN/cm	V sec daN/cm
133	ok	2.17						
134	ok	3.47						
135	ok Av	8.57	0.22	0.19	7.4	6.3	617.3	528.7
136	ok	3.45						
137	ok	2.80						
138	ok Av	5.19	0.09	0.16	3.0	5.4	248.8	451.5
139	ok	2.76						
140	ok	2.36						
141	ok	2.16						
142	ok Av	4.02	0.10	0.10	3.4	3.4	285.4	280.1
143	ok	2.30						
144	ok Av	7.59	0.22	0.13	7.4	4.4	620.4	363.8
145	ok	2.12						
146	ok Av	4.03	0.10	0.10	3.4	3.4	285.7	282.1
147	ok	2.81						
148	ok	2.40						
149	ok	2.84						
150	ok Av	5.20	0.09	0.16	3.0	5.4	249.0	452.8
151	ok	3.47						
152	ok Av	8.60	0.22	0.19	7.4	6.4	618.2	531.7
153	ok	2.17						
154	ok	3.46						
155	ok Av	5.83	0.20	0.05	6.5	1.5	540.7	128.7
156	ok	3.04						
157	ok Av	4.29	0.14	0.05	4.8	1.5	399.3	128.3
158	ok Av	8.98	0.28	0.14	9.2	4.5	767.1	373.5
159	ok Av	5.31	0.18	0.09	5.8	3.0	486.8	252.7
160	ok Av	5.96	0.20	0.02	6.7	0.8	560.9	64.8
161	ok Av	5.32	0.18	0.09	5.8	3.0	487.5	254.2
162	ok Av	9.00	0.28	0.14	9.2	4.5	768.2	376.2
163	ok Av	4.29	0.14	0.05	4.8	1.6	399.1	129.3
164	ok Av	5.82	0.20	0.05	6.5	1.6	539.6	129.9
165	ok	3.01						
166	ok	3.52						
167	ok	3.15						
168	ok Av	6.77	0.22	0.08	7.4	2.7	616.2	225.1
169	ok Av	7.61	0.25	0.08	8.4	2.6	701.5	218.5
170	ok Av	5.82	0.20	0.03	6.6	0.9	550.5	72.9
171	ok Av	5.04	0.17	0.02	5.7	0.7	473.6	61.9
172	ok Av	5.83	0.20	0.03	6.6	0.9	551.2	73.7
173	ok Av	7.65	0.26	0.08	8.5	2.6	705.7	220.1
174	ok Av	6.80	0.22	0.08	7.4	2.7	618.6	224.8
175	ok	3.52						
176	ok	3.18						
177	ok Av	11.95	0.18	0.37	6.1	12.2	510.4	1019.6
178	ok	3.45						
179	ok Av	13.97	0.30	0.37	10.0	12.4	833.1	1033.4
180	ok Av	9.65	0.33	0.13	10.8	4.5	900.9	372.7
181	ok Av	7.49	0.26	0.13	8.5	4.3	708.8	355.6
182	ok Av	6.06	0.21	0.02	6.9	0.7	571.4	57.1
183	ok Av	7.49	0.26	0.13	8.5	4.3	708.7	356.2
184	ok Av	9.61	0.32	0.13	10.8	4.5	897.3	372.8
185	ok Av	13.96	0.30	0.37	10.0	12.4	830.4	1033.6
186	ok Av	11.96	0.19	0.37	6.1	12.2	512.0	1020.6
187	ok	3.46						
188	ok Av	3.72	0.12	0.07	4.1	2.3	344.2	192.0
189	ok Av	3.69	0.13	0.01	4.2	0.5	347.3	39.9
190	ok Av	8.10	0.27	0.08	8.9	2.8	743.6	234.5
191	ok Av	9.04	0.30	0.09	10.1	3.1	841.0	258.4
192	ok Av	7.12	0.24	0.04	8.0	1.2	670.2	102.6
193	ok Av	6.11	0.21	0.02	6.9	0.8	574.7	66.1
194	ok Av	7.11	0.24	0.04	8.0	1.2	669.7	102.7
195	ok Av	9.00	0.30	0.09	10.0	3.1	837.4	257.1
196	ok Av	8.08	0.27	0.08	8.9	2.8	741.3	234.3
197	ok Av	3.70	0.13	0.07	4.2	2.3	346.2	191.9
198	ok Av	3.70	0.13	0.01	4.2	0.5	348.3	40.1
199	ok Av	6.56	0.22	0.07	7.1	2.4	594.6	196.2

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	235 di 288

152.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
190.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
228.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
266.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
305.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
343.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
381.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
419.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
457.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
495.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
533.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
571.9	-4.591e+04	-3.781e+04	5.683e+06	-3.789e+04	1.450e+04	-3.789e+04	5.675e+06	1.450e+04	0.0	0.0	0.0
610.0	-3.711e+04	-2.093e+04	5.070e+06	-2.100e+04	1.415e+04	-2.100e+04	5.062e+06	1.415e+04	0.0	0.0	0.0

Quota	Ctg Vcls	Vrsd Vcls	Vrcd Vcls	Ctg Vac	Vrsd Vac	Vrcd Vac	Vdd	Vid	[A s.i.	Incli.	Dist.]	Vfd
cm		daN	daN		daN	daN	daN	daN	cm2	gradi	cm	daN
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
76.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
152.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
190.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
228.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
266.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
305.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
343.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
381.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
419.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
457.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
495.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
533.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
571.9	1.00	1.450e+04	5.651e+05	1.00	2.429e+05	5.651e+05	0.0	0.0	0.0	0.0	0.0	0.0
610.0	1.00	1.415e+04	5.618e+05	1.00	2.429e+05	5.618e+05	0.0	0.0	0.0	0.0	0.0	0.0

Quota	V[7.4.16]	N	M	V	alfaS	VRd,c	VRd,s	V[7.4.17]	roH	roV	roN
cm		daN	daN cm	daN		daN	daN				
0.0	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
38.1	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
76.3	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
114.4	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
152.5	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
190.6	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
228.8	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
266.9	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
305.0	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
343.1	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
381.3	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
419.4	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
457.5	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
495.6	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
533.8	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
571.9	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
610.0	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0

Quota	V[7.4.16]	V[7.4.17]
0.0	0.0	0.0

Nodo	Stato	x/d	V N/M	ver. rid	Af pr-	Af pr+	Af sec-	Af sec+	N z	N o	N zo	M z	M o	M zo
									daN/cm	daN/cm	daN/cm	daN	daN	daN
10	ok	0.07	0.3	6.39e-02	15.7	15.7	15.7	15.7	-619.0	2.4	-9.7	1.237e+04	-77.3	21.8
11	ok	0.07	0.3	5.96e-02	15.7	15.7	15.7	15.7	-533.4	-28.6	55.2	1.219e+04	417.8	-955.9
12	ok	0.07	0.3	5.30e-02	15.7	15.7	15.7	15.7	-513.5	1.4	-0.4	1.132e+04	7.8	-47.1
13	ok	0.07	0.3	5.33e-02	15.7	15.7	15.7	15.7	-502.5	-10.8	19.1	1.135e+04	130.7	-280.7
14	ok	0.07	0.3	5.00e-02	15.7	15.7	15.7	15.7	-484.9	-0.9	-4.1	1.052e+04	-4.1	-11.1
15	ok	0.07	0.3	5.14e-02	15.7	15.7	15.7	15.7	-488.5	-0.9	3.1	1.055e+04	54.7	-151.9
16	ok	0.07	0.2	4.98e-02	15.7	15.7	15.7	15.7	-474.5	0.9	-3.2	9733.0	-3.5	-1.7
17	ok	0.07	0.2	5.03e-02	15.7	15.7	15.7	15.7	-478.6	1.0	-4.4	9741.9	27.6	-96.5
18	ok	0.07	0.2	4.93e-02	15.7	15.7	15.7	15.7	-468.9	0.9	-3.0	8941.9	-1.5	1.3
19	ok	0.07	0.2	4.94e-02	15.7	15.7	15.7	15.7	-470.1	1.2	-3.9	8945.9	12.1	-73.4
20	ok	0.07	0.2	4.85e-02	15.7	15.7	15.7	15.7	-461.3	0.9	-3.0	8148.9	-0.7	2.7
21	ok	0.07	0.2	4.85e-02	15.7	15.7	15.7	15.7	-461.5	1.1	-3.3	8150.6	5.5	-63.1
22	ok	0.07	0.2	4.76e-02	15.7	15.7	15.7	15.7	-452.7	0.9	-2.9	7355.1	-0.4	3.3
23	ok	0.07	0.2	4.76e-02	15.7	15.7	15.7	15.7	-452.6	1.0	-2.9	7356.0	2.9	-58.1

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	236 di 288

24	ok	0.07	0.2	4.66e-02	15.7	15.7	15.7	15.7	-452.1	-0.9	-2.9	6561.0	-0.3	3.8
25	ok	0.07	0.2	4.67e-02	15.7	15.7	15.7	15.7	-443.5	1.2	-2.3	6561.9	2.4	-55.0
26	ok	0.07	0.1	4.55e-02	15.7	15.7	15.7	15.7	-440.7	-1.0	-2.8	5766.8	-0.5	4.2
27	ok	0.07	0.1	4.57e-02	15.7	15.7	15.7	15.7	-433.9	1.7	-1.0	5768.1	3.6	-51.3
28	ok	0.07	0.1	4.39e-02	15.7	15.7	15.7	15.7	-416.2	1.2	-2.3	4972.1	-1.4	5.1
29	ok	0.07	0.1	4.47e-02	15.7	15.7	15.7	15.7	-433.3	-0.6	-8.35e-02	4974.9	8.1	-44.1
30	ok	0.07	0.1	4.21e-02	15.7	15.7	15.7	15.7	-395.6	4.3	-0.6	4175.5	-5.6	6.5
31	ok	0.07	0.1	4.40e-02	15.7	15.7	15.7	15.7	-426.6	-4.6	-3.8	4182.8	18.7	-28.6
32	ok	0.07	9.55e-02	4.21e-02	15.7	15.7	15.7	15.7	-381.0	32.7	12.9	3365.4	-37.5	-0.8
33	ok	0.07	9.58e-02	4.52e-02	15.7	15.7	15.7	15.7	-432.2	-43.0	-35.4	3402.4	61.9	20.1
34	ok	0.07	7.79e-02	5.57e-02	15.7	15.7	15.7	15.7	-281.5	318.0	212.7	2308.0	-368.6	-264.1
35	ok	0.07	8.43e-02	8.79e-02	15.7	15.7	15.7	15.7	-742.2	-100.7	-288.2	2907.9	143.1	301.3
36	ok	0.07	8.71e-02	0.2	15.7	15.7	15.7	15.7	-1601.1	-558.5	-563.0	2822.1	674.0	803.9
37	ok	0.07	6.05e-02	6.71e-02	15.7	15.7	15.7	15.7	-387.8	-401.8	-255.7	1710.3	546.5	317.9
38	ok	0.07	5.37e-02	7.35e-02	15.7	15.7	15.7	15.7	-219.0	-151.4	-526.4	726.9	421.6	763.9
39	ok	0.07	4.10e-02	5.23e-02	15.7	15.7	15.7	15.7	-421.4	53.9	-218.6	567.1	625.8	371.0
40	ok	0.07	2.88e-02	6.84e-02	15.7	15.7	15.7	15.7	-308.4	519.1	418.0	-370.2	269.3	102.1
41	ok	0.07	4.27e-02	4.06e-03	15.7	15.7	15.7	15.7	343.5	790.4	46.0	-99.2	525.4	69.1
42	ok	0.07	0.3	6.64e-02	15.7	15.7	15.7	15.7	-300.0	78.4	-147.5	1.188e+04	884.0	-496.1
43	ok	0.07	0.3	5.15e-02	15.7	15.7	15.7	15.7	-478.5	-104.6	12.5	1.130e+04	340.0	-305.1
44	ok	0.07	0.2	5.20e-02	15.7	15.7	15.7	15.7	-492.2	-3.6	3.6	1.052e+04	156.3	-205.0
45	ok	0.07	0.2	5.07e-02	15.7	15.7	15.7	15.7	-481.7	1.0	1.7	9733.1	67.9	-164.8
46	ok	0.07	0.2	4.96e-02	15.7	15.7	15.7	15.7	-471.4	1.6	-3.6	8941.3	30.5	-147.1
47	ok	0.07	0.2	4.86e-02	15.7	15.7	15.7	15.7	-461.9	1.4	-3.2	8148.5	13.8	-139.4
48	ok	0.07	0.2	4.76e-02	15.7	15.7	15.7	15.7	-452.9	1.3	-2.9	7354.9	7.2	-135.7
49	ok	0.07	0.2	4.67e-02	15.7	15.7	15.7	15.7	-444.2	1.7	-2.4	6560.9	6.0	-133.3
50	ok	0.07	0.1	4.59e-02	15.7	15.7	15.7	15.7	-445.3	0.4	-1.6	5766.6	9.6	-130.3
51	ok	0.07	0.1	4.52e-02	15.7	15.7	15.7	15.7	-438.6	-0.7	-1.1	4971.9	20.1	-125.0
52	ok	0.07	0.1	4.45e-02	15.7	15.7	15.7	15.7	-431.6	-11.3	-5.6	4176.3	45.5	-113.4
53	ok	0.07	9.57e-02	4.41e-02	15.7	15.7	15.7	15.7	-425.0	-45.0	-29.7	3391.1	95.2	-82.8
54	ok	0.07	7.70e-02	4.23e-02	15.7	15.7	15.7	15.7	-333.7	-213.9	-122.4	2565.1	266.9	-4.4
55	ok	0.07	5.13e-02	3.62e-02	15.7	15.7	15.7	15.7	-150.8	-289.7	-110.6	1600.3	530.6	47.6
56	ok	0.07	2.59e-02	6.33e-03	15.7	15.7	15.7	15.7	-22.6	81.1	-10.8	594.9	742.6	66.1
57	ok	0.07	6.11e-02	4.45e-04	15.7	15.7	15.7	15.7	30.7	831.5	16.1	-73.1	701.9	22.6
58	ok	0.07	0.3	4.41e-02	15.7	15.7	15.7	15.7	-427.7	-117.0	3.5	1.199e+04	1127.5	-197.3
59	ok	0.07	0.3	5.63e-02	15.7	15.7	15.7	15.7	-493.2	-21.4	11.8	1.128e+04	463.8	-189.7
60	ok	0.07	0.2	5.16e-02	15.7	15.7	15.7	15.7	-492.7	-5.4	0.3	1.051e+04	201.5	-207.1
61	ok	0.07	0.2	5.07e-02	15.7	15.7	15.7	15.7	-482.6	0.9	-2.5	9727.8	87.7	-210.8
62	ok	0.07	0.2	4.96e-02	15.7	15.7	15.7	15.7	-472.0	1.8	-2.9	8939.3	38.3	-212.6
63	ok	0.07	0.2	4.86e-02	15.7	15.7	15.7	15.7	-462.1	1.5	-2.9	8147.5	17.2	-213.3
64	ok	0.07	0.2	4.76e-02	15.7	15.7	15.7	15.7	-453.0	1.4	-2.9	7354.3	9.0	-213.5
65	ok	0.07	0.2	4.68e-02	15.7	15.7	15.7	15.7	-453.5	9.66e-02	-2.9	6560.4	7.5	-213.6
66	ok	0.07	0.1	4.60e-02	15.7	15.7	15.7	15.7	-446.3	0.8	-3.0	5765.8	12.0	-213.7
67	ok	0.07	0.1	4.54e-02	15.7	15.7	15.7	15.7	-440.3	-0.8	-3.0	4970.3	25.2	-213.8
68	ok	0.07	0.1	4.45e-02	15.7	15.7	15.7	15.7	-431.4	-14.5	-3.0	4173.0	57.0	-214.3
69	ok	0.07	9.59e-02	4.11e-02	15.7	15.7	15.7	15.7	-396.0	-67.8	-0.9	3374.7	126.7	-217.0
70	ok	0.07	7.66e-02	2.90e-02	15.7	15.7	15.7	15.7	-263.9	-226.3	-1.6	2529.1	304.8	-218.2
71	ok	0.07	5.06e-02	2.78e-02	15.7	15.7	15.7	15.7	-90.7	-258.1	4.1	1579.0	563.6	-207.5
72	ok	0.07	3.09e-02	0.0	15.7	15.7	15.7	15.7	1.2	124.8	-5.4	522.8	854.9	-191.1
73	ok	0.07	6.52e-02	0.0	15.7	15.7	15.7	15.7	1.4	811.6	-4.2	-71.6	785.4	-31.6
74	ok	0.07	0.3	6.64e-02	15.7	15.7	15.7	15.7	-541.0	87.1	-44.3	1.213e+04	862.6	98.2
75	ok	0.07	0.3	5.15e-02	15.7	15.7	15.7	15.7	-499.0	-14.1	-12.0	1.133e+04	370.7	-85.7
76	ok	0.07	0.3	5.20e-02	15.7	15.7	15.7	15.7	-492.2	-3.6	-3.6	1.053e+04	160.4	-196.1
77	ok	0.07	0.2	5.07e-02	15.7	15.7	15.7	15.7	-481.7	1.0	-1.7	9737.1	69.4	-245.0
78	ok	0.07	0.2	4.96e-02	15.7	15.7	15.7	15.7	-471.4	1.6	-2.1	8943.1	30.2	-265.8
79	ok	0.07	0.2	4.86e-02	15.7	15.7	15.7	15.7	-461.9	1.3	-2.6	8149.2	13.6	-274.8
80	ok	0.07	0.2	4.76e-02	15.7	15.7	15.7	15.7	-452.8	1.3	-3.0	7355.2	7.1	-279.0
81	ok	0.07	0.2	4.67e-02	15.7	15.7	15.7	15.7	-453.1	-0.1	-3.5	6561.0	5.9	-281.7
82	ok	0.07	0.1	4.59e-02	15.7	15.7	15.7	15.7	-445.2	0.5	-4.4	5766.8	9.4	-284.8
83	ok	0.07	0.1	4.52e-02	15.7	15.7	15.7	15.7	-438.6	-0.4	-5.0	4972.5	19.8	-290.5
84	ok	0.07	0.1	4.45e-02	15.7	15.7	15.7	15.7	-426.6	-7.9	-0.4	4179.6	44.2	-303.6
85	ok	0.07	9.66e-02	4.41e-02	15.7	15.7	15.7	15.7	-425.0	-45.0	29.7	3398.8	98.5	-336.7
86	ok	0.07	7.92e-02	4.23e-02	15.7	15.7	15.7	15.7	-333.7	-213.9	122.4	2579.2	303.7	-433.1
87	ok	0.07	5.73e-02	3.62e-02	15.7	15.7	15.7	15.7	-150.8	-289.7	110.6	1603.7	616.9	-461.7
88	ok	0.07	3.64e-02	6.33e-03	15.7	15.7	15.7	15.7	-59.6	93.9	16.6	532.4	863.1	-448.8
89	ok	0.07	6.61e-02	4.45e-04	15.7	15.7	15.7	15.7	30.7	831.5	-16.1	-73.1	757.0	-84.0
90	ok	0.07	0.3	5.95e-02	15.7	15.7	15.7	15.7	-533.5	-28.7	-55.4	1.236e+04	420.5	652.6
91	ok	0.07	0.3	5.33e-02	15.7	15.7	15.7	15.7	-502.5	-10.8	-19.1	1.142e+04	136.5	-40.1
92	ok	0.07	0.3	5.14e-02	15.7	15.7	15.7	15.7	-488.5	-0.9	-3.1	1.057e+04	57.0	-189.1
93	ok	0.07	0.2	5.03e-02	15.7	15.7	15.7	15.7	-487.3	-0.5	-0.9	9752.1	22.8	-253.9
94	ok	0.07	0.2	4.94e-02	15.7	15.7	15.7	15.7	-478.9	-0.6	-1.9	8949.5	10.1	-279.1
95	ok	0.07	0.2	4.85e-02	15.7	15.7	15.7	15.7	-470.4	-0.7	-2.6	8152.0	4.5	-290.2
96	ok	0.07	0.2	4.76e-02	15.7	15.7	15.7	15.7	-461.5	-0.8	-3.0	7356.6	2.4	-295.5
97	ok	0.07	0.2	4.67e-02	15.7	15.7	15.7	15.7	-452.3	-0.7	-3.6	6562.2	2.1	-298.8
98	ok	0.07	0.1	4.57e-02	15.7	15.7	15.7	15.7	-442.7	-0.4	-4.7	5768.6	3.3	-302.8
99	ok	0.07	0.1	4.47e-02	15.7	15.7	15.7	15.7	-423.6	1.1	-6.5	4976.4	7.2	-309.9
100	ok	0.07	0.1	4.40e-02	15.7	15.7	15.7	15.7	-416.1	-4.6	-3.6	4186.5	20.1	-327.0

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	237 di 288

101	ok	0.07	9.70e-02	4.52e-02	15.7	15.7	15.7	15.7	-432.2	-43.0	35.4	3411.8	75.2	-382.7
102	ok	0.07	8.93e-02	8.79e-02	15.7	15.7	15.7	15.7	-742.2	-100.7	288.2	3039.7	161.4	-744.4
103	ok	0.07	6.80e-02	6.71e-02	15.7	15.7	15.7	15.7	-387.8	-401.8	255.7	1741.3	744.1	-721.2
104	ok	0.07	5.00e-02	5.23e-02	15.7	15.7	15.7	15.7	-421.4	53.9	218.6	593.2	744.8	-714.0
105	ok	0.07	4.98e-02	4.06e-03	15.7	15.7	15.7	15.7	343.5	790.4	-46.0	-111.2	601.1	-128.9
106	ok	0.07	0.3	6.39e-02	15.7	15.7	15.7	15.7	-619.1	2.6	9.8	1.250e+04	-75.5	-51.5
107	ok	0.07	0.3	5.30e-02	15.7	15.7	15.7	15.7	-502.0	2.9	0.3	1.135e+04	-24.4	-16.8
108	ok	0.07	0.3	5.00e-02	15.7	15.7	15.7	15.7	-479.5	1.2	3.2	1.054e+04	-8.6	-30.3
109	ok	0.07	0.2	4.98e-02	15.7	15.7	15.7	15.7	-474.5	0.9	3.2	9739.4	-3.5	-37.7
110	ok	0.07	0.2	4.93e-02	15.7	15.7	15.7	15.7	-468.9	0.9	3.0	8943.9	-1.5	-41.0
111	ok	0.07	0.2	4.85e-02	15.7	15.7	15.7	15.7	-461.3	0.9	3.0	8149.5	-0.7	-42.4
112	ok	0.07	0.2	4.76e-02	15.7	15.7	15.7	15.7	-452.7	0.9	2.9	7355.3	-0.4	-43.1
113	ok	0.07	0.2	4.66e-02	15.7	15.7	15.7	15.7	-452.1	-0.9	2.9	6561.1	-0.3	-43.5
114	ok	0.07	0.1	4.55e-02	15.7	15.7	15.7	15.7	-440.7	-1.0	2.8	5766.9	-0.5	-44.0
115	ok	0.07	0.1	4.39e-02	15.7	15.7	15.7	15.7	-416.2	1.2	2.3	4972.2	-1.6	-44.8
116	ok	0.07	0.1	4.21e-02	15.7	15.7	15.7	15.7	-395.6	4.3	0.6	4176.2	-7.3	-46.0
117	ok	0.07	9.56e-02	4.21e-02	15.7	15.7	15.7	15.7	-381.0	32.7	-12.9	3365.8	-53.2	-34.0
118	ok	0.07	7.86e-02	5.57e-02	15.7	15.7	15.7	15.7	-281.5	318.0	-212.7	2226.4	-528.6	329.7
119	ok	0.07	9.48e-02	0.2	15.7	15.7	15.7	15.7	-1601.1	-558.5	563.0	3223.4	969.9	-1121.0
120	ok	0.07	6.35e-02	7.35e-02	15.7	15.7	15.7	15.7	-219.0	-151.4	526.4	890.9	537.9	-1130.3
121	ok	0.07	3.19e-02	6.84e-02	15.7	15.7	15.7	15.7	-308.4	519.1	-418.0	-495.8	313.4	-156.7
122	ok	0.07	4.36e-03	0.0	15.7	15.7	15.7	15.7	204.4	159.6	143.7	-83.2	-12.4	-50.1
123	ok	0.07	2.17e-02	2.94e-02	15.7	15.7	15.7	15.7	302.8	-54.2	109.5	-487.1	-94.2	-143.8
124	ok	0.07	3.45e-02	8.04e-02	15.7	15.7	15.7	15.7	-205.8	-361.9	137.8	520.0	7.9	-139.8
125	ok	0.07	5.30e-02	0.1	15.7	15.7	15.7	15.7	-328.6	-455.7	-608.0	642.0	376.7	609.9
126	ok	0.07	5.17e-02	7.23e-02	15.7	15.7	15.7	15.7	-379.3	343.4	-382.3	1011.2	-65.4	709.1
127	ok	0.07	2.52e-02	2.94e-02	15.7	15.7	15.7	15.7	302.8	-54.2	-109.5	-575.4	-55.2	154.9
128	ok	0.07	5.93e-02	0.1	15.7	15.7	15.7	15.7	-328.6	-455.7	608.0	833.4	471.5	-833.1
129	ok	0.07	6.26e-02	7.23e-02	15.7	15.7	15.7	15.7	-379.3	343.4	382.3	1392.5	-102.4	-980.4
130	ok	0.07	5.88e-03	0.0	15.7	15.7	15.7	15.7	204.4	159.6	-143.7	-110.4	-24.6	66.9
131	ok	0.07	3.66e-02	8.04e-02	15.7	15.7	15.7	15.7	-205.8	-361.9	-137.8	715.5	12.6	189.0
132	ok	0.07	2.22e-02	3.74e-02	15.7	15.7	15.7	15.7	-207.1	198.0	295.4	-355.4	72.0	-109.3
364	ok	0.07	2.04e-02	3.74e-02	15.7	15.7	15.7	15.7	-207.1	198.0	-295.4	-259.1	50.7	81.9
553	ok	0.07	0.3	8.17e-02	15.7	15.7	15.7	15.7	-786.6	-22.3	64.6	1.263e+04	188.0	-881.3
554	ok	0.07	0.3	4.45e-02	15.7	15.7	15.7	15.7	-425.4	41.3	-54.5	1.219e+04	1181.3	-243.0
555	ok	0.07	0.3	4.17e-02	15.7	15.7	15.7	15.7	-374.0	119.8	-7.7	1.318e+04	1425.7	-278.1
556	ok	0.07	0.3	4.55e-02	15.7	15.7	15.7	15.7	-441.0	56.2	12.3	1.351e+04	1839.0	-324.7
557	ok	0.07	0.3	4.16e-02	15.7	15.7	15.7	15.7	-388.6	-42.3	-74.0	1.352e+04	1514.0	-169.8
558	ok	0.07	0.3	4.46e-02	15.7	15.7	15.7	15.7	-426.0	41.1	54.4	1.275e+04	1200.2	208.3
559	ok	0.07	0.3	8.17e-02	15.7	15.7	15.7	15.7	-787.1	-22.5	-64.8	1.318e+04	162.6	814.6

Nodo	x/d	V N/M	ver. rid	Af pr-	Af pr+	Af sec-	Af sec+	N z	N o	N zo	M z	M o	M zo
0.07	0.33	0.19	15.71	15.71	15.71	15.71	-1601.06	-558.54	-607.99	-575.38	-528.64	-1130.27	
							343.46	831.53	607.99	1.352e+04	1839.05	814.59	

Nodo	Stato	Max tau daN/cm2	Ver V pr	Ver V sec	Af V pr	Af V sec	V pr daN/cm	V sec daN/cm
10	ok	1.49						
11	ok	0.52						
12	ok	0.18						
13	ok	0.32						
14	ok	0.24						
15	ok	0.32						
16	ok	0.30						
17	ok	0.32						
18	ok	0.33						
19	ok	0.33						
20	ok	0.34						
21	ok	0.33						
22	ok	0.35						
23	ok	0.33						
24	ok	0.35						
25	ok	0.33						
26	ok	0.36						
27	ok	0.33						
28	ok	0.37						
29	ok	0.33						
30	ok	0.39						
31	ok	0.33						
32	ok	0.43						
33	ok	0.34						
34	ok	0.60						
35	ok	0.32						
36	ok	0.53						
37	ok	0.42						
38	ok	0.46						

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	238 di 288

39	ok	0.35
40	ok	0.86
41	ok	0.51
42	ok	0.78
43	ok	0.42
44	ok	0.36
45	ok	0.34
46	ok	0.33
47	ok	0.32
48	ok	0.32
49	ok	0.32
50	ok	0.32
51	ok	0.32
52	ok	0.31
53	ok	0.30
54	ok	0.28
55	ok	0.31
56	ok	0.31
57	ok	0.19
58	ok	0.70
59	ok	0.45
60	ok	0.38
61	ok	0.35
62	ok	0.34
63	ok	0.33
64	ok	0.33
65	ok	0.33
66	ok	0.32
67	ok	0.32
68	ok	0.31
69	ok	0.29
70	ok	0.28
71	ok	0.30
72	ok	0.29
73	ok	0.14
74	ok	0.79
75	ok	0.45
76	ok	0.39
77	ok	0.37
78	ok	0.36
79	ok	0.35
80	ok	0.35
81	ok	0.35
82	ok	0.35
83	ok	0.34
84	ok	0.34
85	ok	0.32
86	ok	0.29
87	ok	0.33
88	ok	0.32
89	ok	0.46
90	ok	0.53
91	ok	0.43
92	ok	0.43
93	ok	0.43
94	ok	0.43
95	ok	0.43
96	ok	0.43
97	ok	0.43
98	ok	0.43
99	ok	0.43
100	ok	0.43
101	ok	0.44
102	ok	0.41
103	ok	0.51
104	ok	0.40
105	ok	0.81
106	ok	1.53
107	ok	0.53
108	ok	0.63
109	ok	0.69
110	ok	0.72
111	ok	0.73
112	ok	0.74
113	ok	0.74
114	ok	0.75
115	ok	0.76

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	240 di 288

419.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
457.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
495.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
533.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
571.9	-4.591e+04	-3.781e+04	5.683e+06	-3.789e+04	1.450e+04	-3.789e+04	5.675e+06	1.450e+04	0.0	0.0	0.0
610.0	-3.711e+04	-2.093e+04	5.070e+06	-2.100e+04	1.415e+04	-2.100e+04	5.062e+06	1.415e+04	0.0	0.0	0.0

Quota	Ctg Vcls	Vrsd Vcls	Vrcd Vcls	Ctg Vac	Vrsd Vac	Vrcd Vac	Vdd	Vid	[A s.i.	Incli.	Dist.]	Vfd
cm		daN	daN		daN	daN	daN	daN	cm2	gradi	cm	daN
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
76.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
152.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
190.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
228.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
266.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
305.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
343.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
381.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
419.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
457.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
495.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
533.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
571.9	1.00	1.450e+04	5.651e+05	1.00	2.429e+05	5.651e+05	0.0	0.0	0.0	0.0	0.0	0.0
610.0	1.00	1.415e+04	5.618e+05	1.00	2.429e+05	5.618e+05	0.0	0.0	0.0	0.0	0.0	0.0

Quota	V[7.4.16]	N	M	V	alfaS	VRd,c	VRd,s	V[7.4.17]	roH	roV	roN
cm		daN	daN cm	daN		daN	daN				
0.0	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
38.1	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
76.3	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
114.4	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
152.5	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
190.6	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
228.8	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
266.9	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
305.0	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
343.1	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
381.3	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
419.4	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
457.5	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
495.6	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
533.8	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
571.9	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0
610.0	0.0	0.0	0.0	0.0	2.00	0.0	0.0	0.0	5.24e-03	5.24e-03	0.0

Quota	V[7.4.16]	V[7.4.17]
0.0	0.0	0.0

Nodo	Stato	x/d	V N/M	ver. rid	Af pr-	Af pr+	Af sec-	Af sec+	N z	N o	N zo	M z	M o	M zo
									daN/cm	daN/cm	daN/cm	daN	daN	daN
179	ok	0.07	0.3	8.17e-02	15.7	15.7	15.7	15.7	-786.6	-22.3	64.6-1.261e+04	-180.9	856.4	
180	ok	0.07	0.3	4.45e-02	15.7	15.7	15.7	15.7	-425.4	41.3	-54.5-1.221e+04	-1166.4	239.6	
181	ok	0.07	0.3	4.17e-02	15.7	15.7	15.7	15.7	-374.0	119.8	-7.7-1.320e+04	-1436.9	244.6	
182	ok	0.07	0.3	4.55e-02	15.7	15.7	15.7	15.7	-441.0	56.2	12.3-1.348e+04	-1837.1	278.2	
183	ok	0.07	0.3	4.16e-02	15.7	15.7	15.7	15.7	-373.6	119.9	7.9-1.343e+04	-1533.9	-218.5	
184	ok	0.07	0.3	4.46e-02	15.7	15.7	15.7	15.7	-426.0	41.1	54.4-1.277e+04	-1185.3	-204.9	
185	ok	0.07	0.3	8.17e-02	15.7	15.7	15.7	15.7	-787.1	-22.5	-64.8-1.315e+04	-155.4	-789.7	
241	ok	0.07	0.3	6.39e-02	15.7	15.7	15.7	15.7	-619.0	2.4	-9.7-1.237e+04	76.6	-17.8	
242	ok	0.07	0.3	5.96e-02	15.7	15.7	15.7	15.7	-533.4	-28.6	55.2-1.219e+04	-410.9	951.6	
243	ok	0.07	0.3	5.30e-02	15.7	15.7	15.7	15.7	-513.5	1.4	-0.4-1.132e+04	-7.1	46.8	
244	ok	0.07	0.3	5.33e-02	15.7	15.7	15.7	15.7	-502.5	-10.8	19.1-1.135e+04	-131.0	282.1	
245	ok	0.07	0.3	5.00e-02	15.7	15.7	15.7	15.7	-484.9	-0.9	-4.1-1.052e+04	4.3	11.1	
246	ok	0.07	0.3	5.14e-02	15.7	15.7	15.7	15.7	-488.5	-0.9	3.1-1.055e+04	-54.8	152.3	
247	ok	0.07	0.2	4.98e-02	15.7	15.7	15.7	15.7	-474.5	0.9	-3.2 -9733.0	3.5	1.8	
248	ok	0.07	0.2	5.03e-02	15.7	15.7	15.7	15.7	-478.6	1.0	-4.4 -9742.0	-27.7	96.7	
249	ok	0.07	0.2	4.93e-02	15.7	15.7	15.7	15.7	-468.9	0.9	-3.0 -8941.9	1.5	-1.3	
250	ok	0.07	0.2	4.94e-02	15.7	15.7	15.7	15.7	-470.1	1.2	-3.9 -8945.9	-12.1	73.5	
251	ok	0.07	0.2	4.85e-02	15.7	15.7	15.7	15.7	-461.3	0.9	-3.0 -8148.9	0.7	-2.7	
252	ok	0.07	0.2	4.85e-02	15.7	15.7	15.7	15.7	-461.5	1.1	-3.3 -8150.7	-5.5	63.1	
253	ok	0.07	0.2	4.76e-02	15.7	15.7	15.7	15.7	-452.7	0.9	-2.9 -7355.1	0.4	-3.3	
254	ok	0.07	0.2	4.76e-02	15.7	15.7	15.7	15.7	-452.6	1.0	-2.9 -7356.0	-2.9	58.1	

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	242 di 288

332	ok	0.07	9.70e-02	4.52e-02	15.7	15.7	15.7	15.7	-432.2	-43.0	35.4	-3411.8	-75.2	382.7
333	ok	0.07	8.93e-02	8.79e-02	15.7	15.7	15.7	15.7	-742.2	-100.7	288.2	-3039.7	-161.4	744.4
334	ok	0.07	6.80e-02	6.71e-02	15.7	15.7	15.7	15.7	-387.8	-401.8	255.7	-1741.3	-744.1	721.2
335	ok	0.07	5.00e-02	5.23e-02	15.7	15.7	15.7	15.7	-421.4	53.9	218.6	-593.2	-744.8	714.0
336	ok	0.07	4.98e-02	4.06e-03	15.7	15.7	15.7	15.7	343.5	790.4	-46.0	111.2	-601.1	128.9
337	ok	0.07	0.3	6.39e-02	15.7	15.7	15.7	15.7	-619.1	2.6	9.8-1.251e+04		74.8	47.5
338	ok	0.07	0.3	5.30e-02	15.7	15.7	15.7	15.7	-502.0	2.9	0.3-1.135e+04		24.2	16.6
339	ok	0.07	0.3	5.00e-02	15.7	15.7	15.7	15.7	-479.5	1.2	3.2-1.054e+04		8.6	30.3
340	ok	0.07	0.2	4.98e-02	15.7	15.7	15.7	15.7	-474.5	0.9	3.2	-9739.4	3.5	37.6
341	ok	0.07	0.2	4.93e-02	15.7	15.7	15.7	15.7	-468.9	0.9	3.0	-8943.9	1.5	40.9
342	ok	0.07	0.2	4.85e-02	15.7	15.7	15.7	15.7	-461.3	0.9	3.0	-8149.5	0.7	42.4
343	ok	0.07	0.2	4.76e-02	15.7	15.7	15.7	15.7	-452.7	0.9	2.9	-7355.3	0.4	43.1
344	ok	0.07	0.2	4.66e-02	15.7	15.7	15.7	15.7	-452.1	-0.9	2.9	-6561.1	0.3	43.5
345	ok	0.07	0.1	4.55e-02	15.7	15.7	15.7	15.7	-440.7	-1.0	2.8	-5766.9	0.5	44.0
346	ok	0.07	0.1	4.39e-02	15.7	15.7	15.7	15.7	-416.2	1.2	2.3	-4972.2	1.6	44.8
347	ok	0.07	0.1	4.21e-02	15.7	15.7	15.7	15.7	-395.6	4.3	0.6	-4176.2	7.3	46.0
348	ok	0.07	9.56e-02	4.21e-02	15.7	15.7	15.7	15.7	-381.0	32.7	-12.9	-3365.8	53.2	34.0
349	ok	0.07	7.86e-02	5.57e-02	15.7	15.7	15.7	15.7	-281.5	318.0	-212.7	-2226.4	528.6	-329.7
350	ok	0.07	9.48e-02	0.2	15.7	15.7	15.7	15.7	-1601.1	-558.5	563.0	-3223.4	-969.9	1121.0
351	ok	0.07	6.35e-02	7.35e-02	15.7	15.7	15.7	15.7	-219.0	-151.4	526.4	-890.9	-537.9	1130.3
352	ok	0.07	3.19e-02	6.84e-02	15.7	15.7	15.7	15.7	-308.4	519.1	-418.0	495.8	-313.4	156.7
353	ok	0.07	4.36e-03	0.0	15.7	15.7	15.7	15.7	204.4	159.6	143.7	83.2	12.4	50.1
354	ok	0.07	2.17e-02	2.94e-02	15.7	15.7	15.7	15.7	302.8	-54.2	109.5	487.1	94.2	143.8
355	ok	0.07	3.45e-02	8.04e-02	15.7	15.7	15.7	15.7	-205.8	-361.9	137.8	-520.0	-7.9	139.8
356	ok	0.07	5.30e-02	0.1	15.7	15.7	15.7	15.7	-328.6	-455.7	-608.0	-642.0	-376.7	-609.9
357	ok	0.07	5.17e-02	7.23e-02	15.7	15.7	15.7	15.7	-379.3	343.4	-382.3	-1011.2	65.4	-709.1
358	ok	0.07	2.52e-02	2.94e-02	15.7	15.7	15.7	15.7	302.8	-54.2	-109.5	575.4	55.2	-154.9
359	ok	0.07	5.93e-02	0.1	15.7	15.7	15.7	15.7	-328.6	-455.7	608.0	-833.4	-471.5	833.1
360	ok	0.07	6.26e-02	7.23e-02	15.7	15.7	15.7	15.7	-379.3	343.4	382.3	-1392.5	102.4	980.4
361	ok	0.07	5.88e-03	0.0	15.7	15.7	15.7	15.7	204.4	159.6	-143.7	110.4	24.6	-66.9
362	ok	0.07	3.66e-02	8.04e-02	15.7	15.7	15.7	15.7	-205.8	-361.9	-137.8	-715.5	-12.6	-189.0
363	ok	0.07	2.22e-02	3.74e-02	15.7	15.7	15.7	15.7	-207.1	198.0	295.4	355.4	-72.0	109.3
365	ok	0.07	2.04e-02	3.74e-02	15.7	15.7	15.7	15.7	-207.1	198.0	-295.4	259.1	-50.7	-81.9

Nodo	x/d	V N/M	ver. rid	Af pr-	Af pr+	Af sec-	Af sec+	N z	N o	N zo	M z	M o	M zo
	0.07	0.33	0.19	15.71	15.71	15.71	15.71	-1601.06	-558.54	-607.99-1.348e+04	-1837.09	-1837.09	-803.94
								343.46	831.53	607.99	575.38	528.64	1130.27

Nodo	Stato	Max tau daN/cm2	Ver V pr	Ver V sec	Af V pr	Af V sec	V pr daN/cm	V sec daN/cm
179	ok Av	4.17	0.10	0.10	3.4	3.3	164.7	157.6
180	ok	1.60						
181	ok	1.38						
182	ok	1.23						
183	ok	1.33						
184	ok	1.70						
185	ok	3.66						
241	ok	1.45						
242	ok	0.50						
243	ok	0.18						
244	ok	0.32						
245	ok	0.24						
246	ok	0.32						
247	ok	0.30						
248	ok	0.32						
249	ok	0.33						
250	ok	0.33						
251	ok	0.34						
252	ok	0.33						
253	ok	0.35						
254	ok	0.33						
255	ok	0.35						
256	ok	0.33						
257	ok	0.36						
258	ok	0.33						
259	ok	0.37						
260	ok	0.33						
261	ok	0.39						
262	ok	0.33						
263	ok	0.43						
264	ok	0.34						
265	ok	0.60						
266	ok	0.32						
267	ok	0.53						
268	ok	0.42						
269	ok	0.46						

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	243 di 288

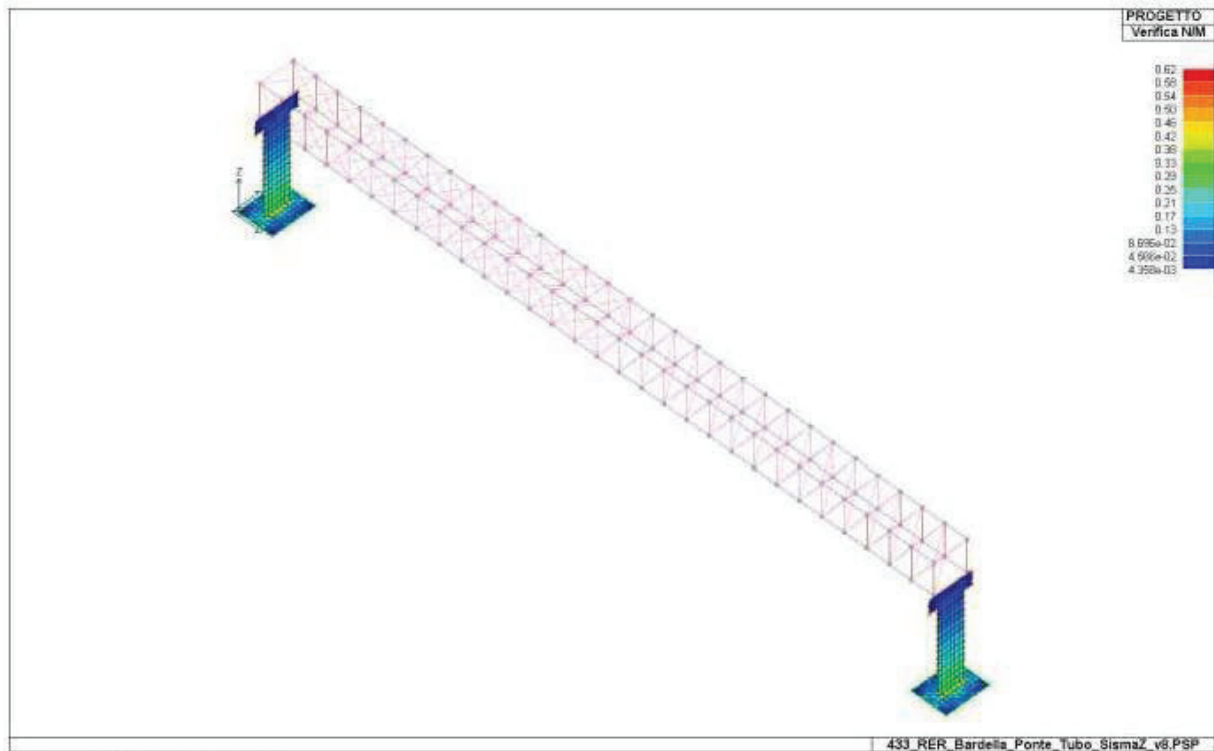
270	ok	0.35
271	ok	0.86
272	ok	0.51
273	ok	0.74
274	ok	0.42
275	ok	0.36
276	ok	0.34
277	ok	0.33
278	ok	0.32
279	ok	0.32
280	ok	0.32
281	ok	0.32
282	ok	0.32
283	ok	0.31
284	ok	0.30
285	ok	0.28
286	ok	0.31
287	ok	0.31
288	ok	0.19
289	ok	0.68
290	ok	0.45
291	ok	0.38
292	ok	0.35
293	ok	0.34
294	ok	0.33
295	ok	0.33
296	ok	0.33
297	ok	0.32
298	ok	0.32
299	ok	0.31
300	ok	0.29
301	ok	0.28
302	ok	0.30
303	ok	0.29
304	ok	0.14
305	ok	0.76
306	ok	0.45
307	ok	0.39
308	ok	0.37
309	ok	0.36
310	ok	0.35
311	ok	0.35
312	ok	0.35
313	ok	0.35
314	ok	0.34
315	ok	0.34
316	ok	0.32
317	ok	0.29
318	ok	0.33
319	ok	0.32
320	ok	0.46
321	ok	0.53
322	ok	0.43
323	ok	0.43
324	ok	0.43
325	ok	0.43
326	ok	0.43
327	ok	0.43
328	ok	0.43
329	ok	0.43
330	ok	0.43
331	ok	0.43
332	ok	0.44
333	ok	0.41
334	ok	0.51
335	ok	0.40
336	ok	0.81
337	ok	1.49
338	ok	0.53
339	ok	0.63
340	ok	0.69
341	ok	0.72
342	ok	0.73
343	ok	0.74
344	ok	0.74
345	ok	0.75
346	ok	0.76

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	244 di 288

347	ok	0.78
348	ok	0.83
349	ok	1.02
350	ok	0.92
351	ok	0.59
352	ok	1.23
353	ok	0.08
354	ok	0.33
355	ok	0.29
356	ok	0.74
357	ok	1.89
358	ok	0.40
359	ok	1.00
360	ok	2.60
361	ok	0.09
362	ok	0.43
363	ok	0.23
365	ok	0.16

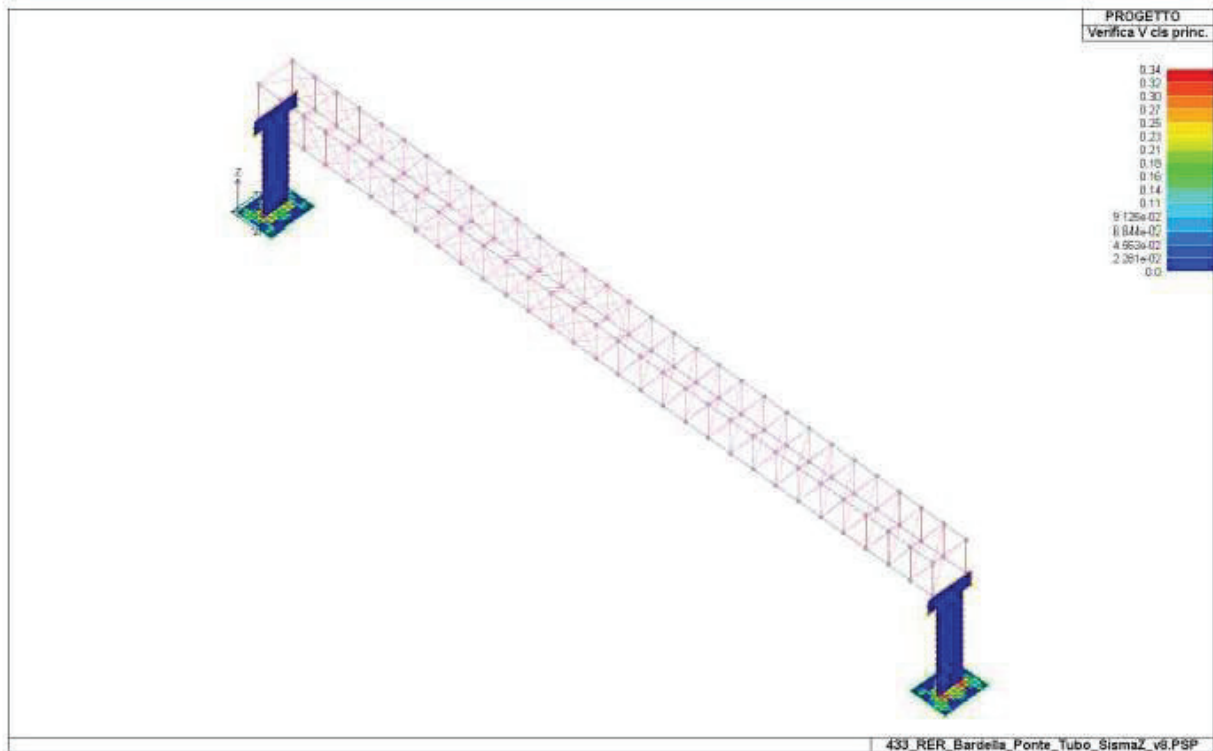
Nodo	Max tau	Ver V pr	Ver V sec	Af V pr	Af V sec	V pr	V sec
	4.17	0.10	0.10	3.42	3.27	164.73	157.57



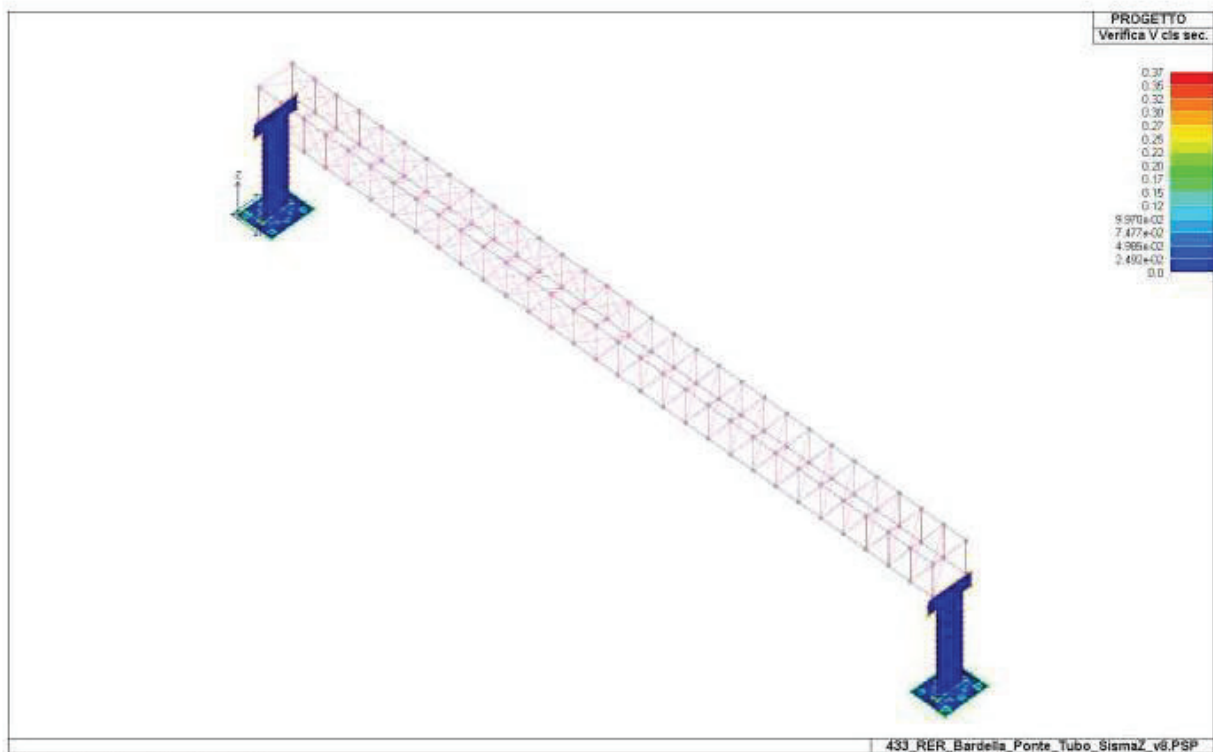
72_PRO_CA_D3_VER_NM

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	245 di 288



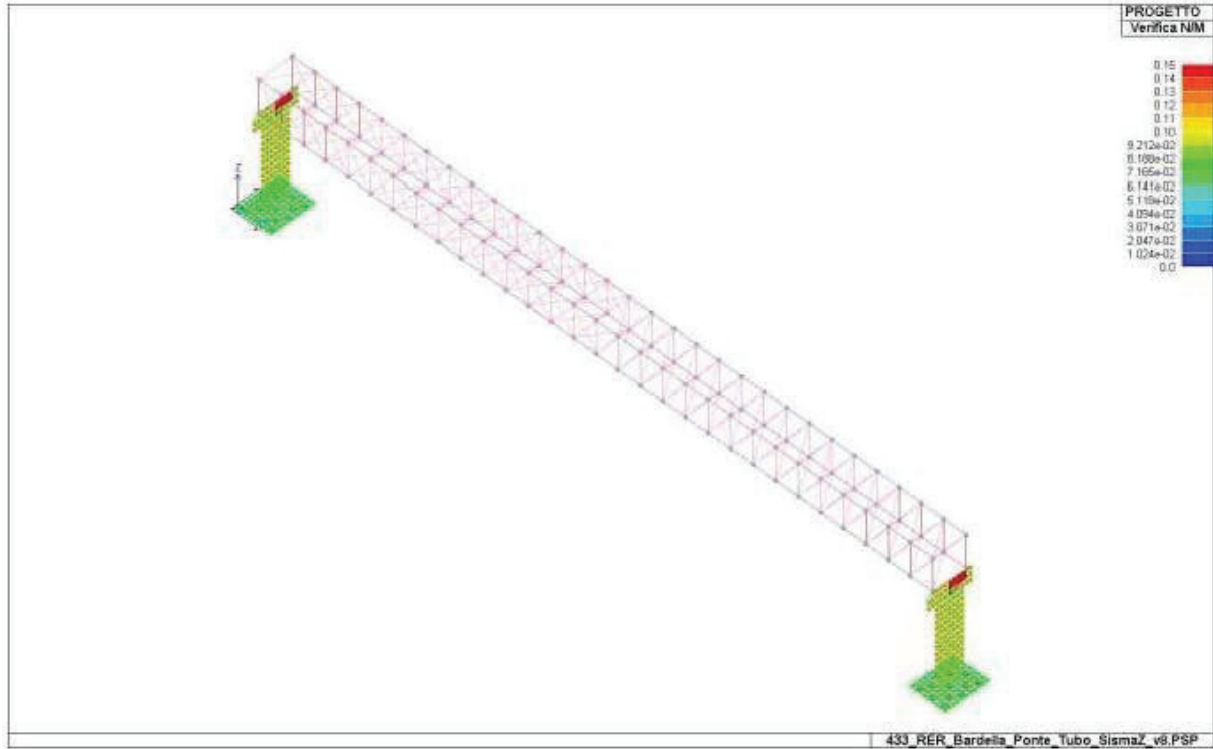
72_PRO_CA_D3_VER_VI



72_PRO_CA_D3_VER_VII

PONTE-TUBO - RELAZIONE DI CALCOLO

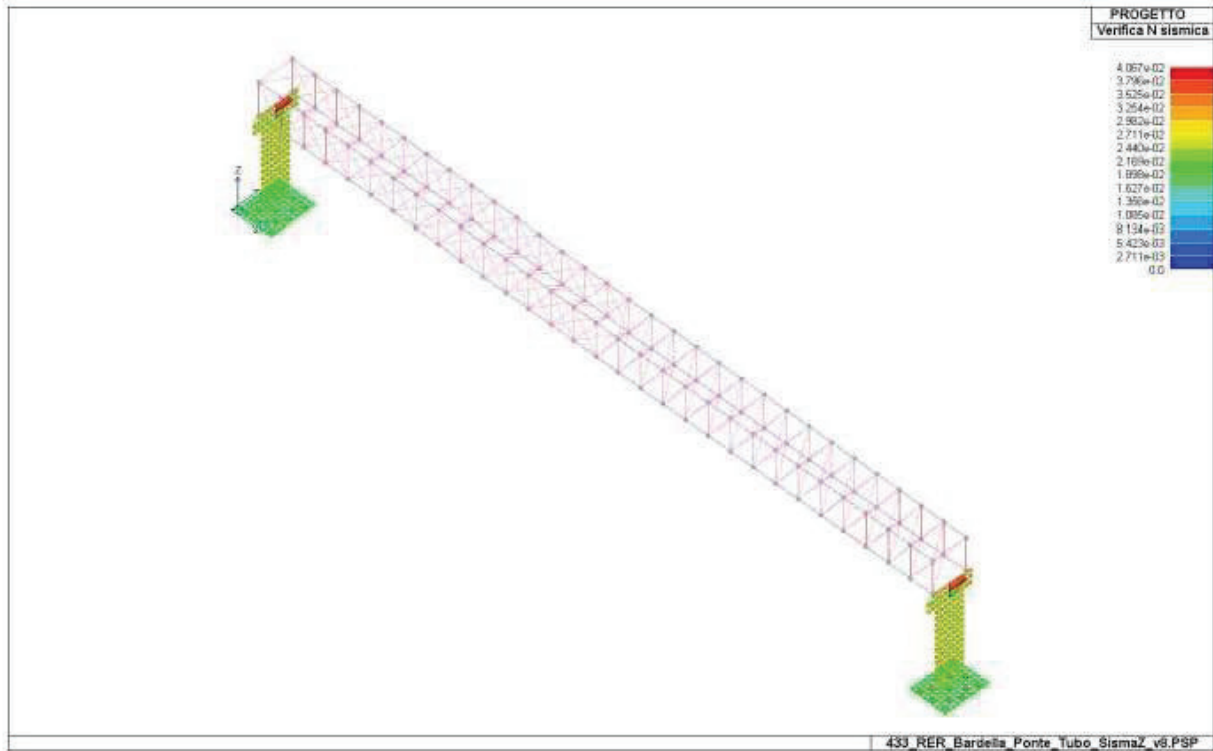
COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	246 di 288



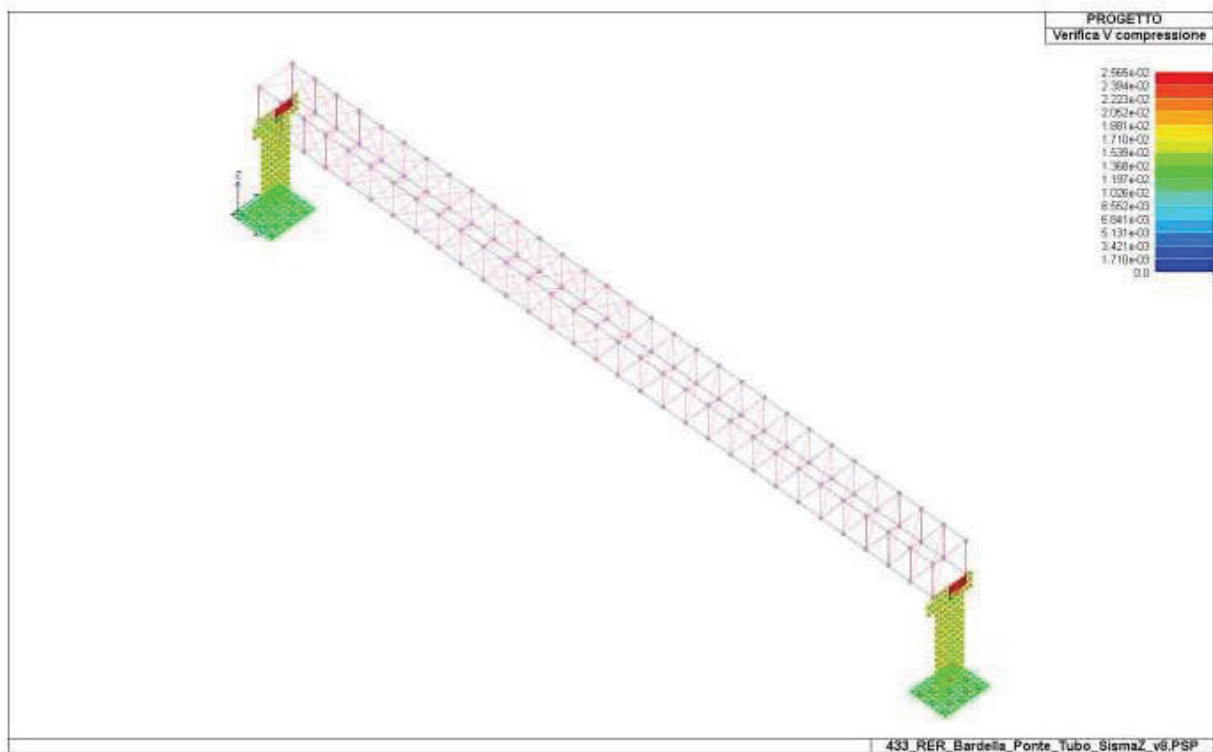
72_PRO_CA_PAR_VER_NM

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	247 di 288



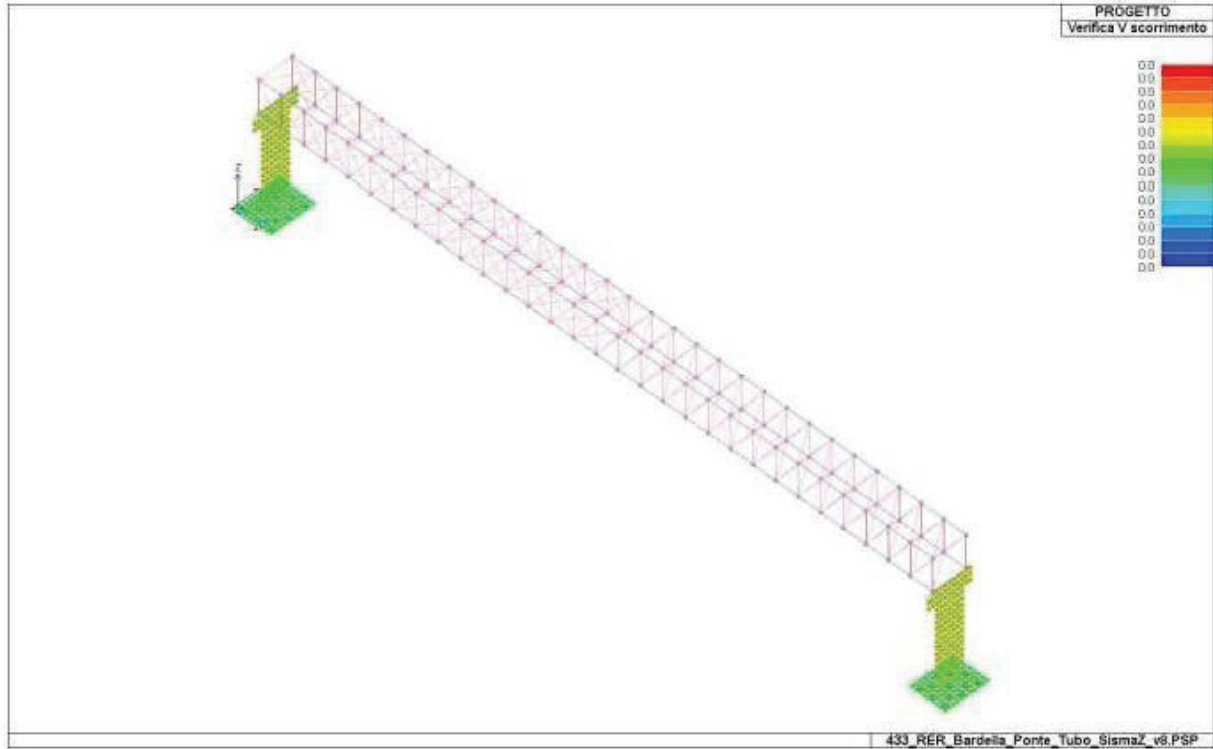
72_PRO_CA_PAR_VER_NSIS



72_PRO_CA_PAR_VER_VC

PONTE-TUBO - RELAZIONE DI CALCOLO

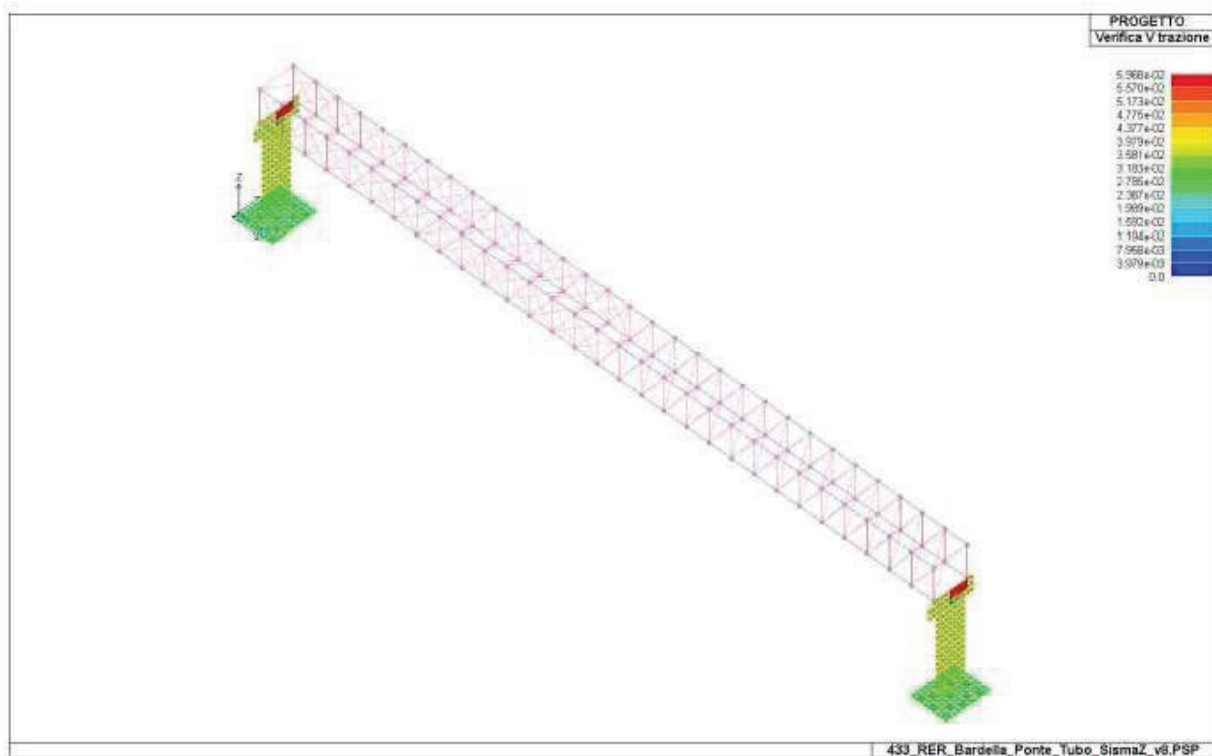
COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	248 di 288



72_PRO_CA_PAR_VER_VS

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	249 di 288



72_PRO_CA_PAR_VER_VT

STATI LIMITE D' ESERCIZIO

LEGENDA TABELLA STATI LIMITE D' ESERCIZIO

In tabella vengono riportati i valori di interesse per il controllo degli stati limite d'esercizio.

In particolare vengono riportati, in relazione al tipo di elemento strutturale, i risultati relativi alle tre categorie di combinazione considerate:

- Combinazioni rare
- Combinazioni frequenti
- Combinazioni quasi permanenti.

I valori di interesse sono i seguenti:

rRfck	rapporto tra la massima compressione nel calcestruzzo e la tensione fck in combinazioni rare [normalizzato a 1]
rRfyk	rapporto tra la massima tensione nell'acciaio e la tensione fyk in combinazioni rare [normalizzato a 1]
rPfck	rapporto tra la massima compressione nel calcestruzzo e la tensione fck in combinazioni quasi permanenti [normalizzato a 1]
wR	apertura caratteristica delle fessure in combinazioni rare [mm]
wF	apertura caratteristica delle fessure in combinazioni frequenti [mm]
wP	apertura caratteristica delle fessure in combinazioni quasi permanenti [mm]
dR	massima deformazione in combinazioni rare
dF	massima deformazione in combinazioni frequenti
dP	massima deformazione in combinazioni quasi permanenti

Per ognuno dei nove valori soprariportati viene indicata (Rif.cmb) la combinazione in cui si è verificato.

In relazione al tipo di elemento strutturale i valori sono selezionati nel modo seguente:

pilastr	rRfck	rRfyk	rPfck	per sezioni significative
travi	rRfck	rRfyk	rPfck	per sezioni significative
	wR	wF	wP	per sezioni significative
	dR	dF	dP	massimi in campata
setti e gusci	rRfck	rRfyk	rPfck	massimi nei nodi dell'elemento
	wR	wF	wP	massimi nei nodi dell'elemento

Si precisa che i valori di massima deformazione per travi sono riferiti al piano verticale (piano locale 1-2 con momenti flettenti 3-3).

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
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Setto	rRfck	rRfyk	rPfck	Rif. cmb	wR mm	wF mm	wP mm	Rif. cmb
33	0.12	0.10	0.15	136,136,140	0.0	0.0	0.0	0,0,0
34	0.11	0.08	0.14	136,136,140	0.0	0.0	0.0	0,0,0
35	0.10	0.08	0.13	136,136,140	0.0	0.0	0.0	0,0,0
36	0.10	0.07	0.12	136,136,140	0.0	0.0	0.0	0,0,0
37	0.09	0.06	0.11	136,136,140	0.0	0.0	0.0	0,0,0
38	0.08	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
39	0.07	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
40	0.07	0.05	0.09	136,136,140	0.0	0.0	0.0	0,0,0
41	0.06	0.05	0.08	136,136,140	0.0	0.0	0.0	0,0,0
42	0.06	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
43	0.05	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
44	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
45	0.04	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
46	0.12	0.26	0.16	136,136,140	0.0	0.0	0.0	0,0,0
47	0.07	0.28	0.09	136,136,140	0.0	0.0	0.0	0,0,0
48	0.04	0.53	0.05	136,136,140	0.0	0.0	0.0	0,0,0
49	0.12	0.20	0.16	136,136,140	0.0	0.0	0.0	0,0,0
50	0.11	0.08	0.14	136,136,140	0.0	0.0	0.0	0,0,0
51	0.10	0.07	0.13	136,136,140	0.0	0.0	0.0	0,0,0
52	0.10	0.07	0.12	136,136,140	0.0	0.0	0.0	0,0,0
53	0.09	0.06	0.11	136,136,140	0.0	0.0	0.0	0,0,0
54	0.08	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
55	0.07	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
56	0.07	0.05	0.09	136,136,140	0.0	0.0	0.0	0,0,0
57	0.06	0.05	0.08	136,136,140	0.0	0.0	0.0	0,0,0
58	0.06	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
59	0.05	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
60	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
61	0.04	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
62	0.04	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
63	0.04	0.09	0.05	136,136,140	0.0	0.0	0.0	0,0,0
64	0.02	0.56	0.02	136,136,140	0.0	0.0	0.0	0,0,0
65	0.12	0.13	0.16	136,136,140	0.0	0.0	0.0	0,0,0
66	0.11	0.12	0.15	136,136,140	0.0	0.0	0.0	0,0,0
67	0.10	0.07	0.13	136,136,140	0.0	0.0	0.0	0,0,0
68	0.09	0.07	0.12	136,136,140	0.0	0.0	0.0	0,0,0
69	0.09	0.06	0.11	136,136,140	0.0	0.0	0.0	0,0,0
70	0.08	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
71	0.07	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
72	0.07	0.05	0.09	136,136,140	0.0	0.0	0.0	0,0,0
73	0.06	0.05	0.08	136,136,140	0.0	0.0	0.0	0,0,0
74	0.06	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
75	0.05	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
76	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
77	0.04	0.03	0.05	136,136,140	0.0	0.0	0.0	0,0,0
78	0.03	0.03	0.04	136,136,140	0.0	0.0	0.0	0,0,0
79	0.02	0.09	0.03	136,136,140	0.0	0.0	0.0	0,0,0
80	6.19e-03	0.55	8.01e-03	136,136,140	0.0	0.0	0.0	0,0,0
81	0.13	0.14	0.16	136,136,140	0.0	0.0	0.0	0,0,0
82	0.11	0.12	0.15	136,136,140	0.0	0.0	0.0	0,0,0
83	0.10	0.07	0.13	136,136,140	0.0	0.0	0.0	0,0,0
84	0.09	0.07	0.12	136,136,140	0.0	0.0	0.0	0,0,0
85	0.09	0.07	0.11	136,136,140	0.0	0.0	0.0	0,0,0
86	0.08	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
87	0.07	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
88	0.07	0.05	0.09	136,136,140	0.0	0.0	0.0	0,0,0
89	0.06	0.05	0.08	136,136,140	0.0	0.0	0.0	0,0,0
90	0.06	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
91	0.05	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
92	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
93	0.04	0.03	0.05	136,136,140	0.0	0.0	0.0	0,0,0
94	0.03	0.03	0.05	136,136,140	0.0	0.0	0.0	0,0,0
95	0.03	0.09	0.03	136,136,140	0.0	0.0	0.0	0,0,0
96	9.63e-03	0.55	0.01	136,136,140	0.0	0.0	0.0	0,0,0
97	0.13	0.19	0.16	136,136,140	0.0	0.0	0.0	0,0,0
98	0.11	0.08	0.15	136,136,140	0.0	0.0	0.0	0,0,0
99	0.10	0.08	0.13	136,136,140	0.0	0.0	0.0	0,0,0
100	0.10	0.07	0.12	136,136,140	0.0	0.0	0.0	0,0,0
101	0.09	0.07	0.11	136,136,140	0.0	0.0	0.0	0,0,0
102	0.08	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
103	0.07	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
104	0.07	0.05	0.09	136,136,140	0.0	0.0	0.0	0,0,0
105	0.06	0.05	0.08	136,136,140	0.0	0.0	0.0	0,0,0

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
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106	0.06	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
107	0.05	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
108	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
109	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
110	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
111	0.04	0.09	0.05	136,136,140	0.0	0.0	0.0	0,0,0
112	0.02	0.56	0.02	136,136,140	0.0	0.0	0.0	0,0,0
113	0.12	0.11	0.16	136,136,140	0.0	0.0	0.0	0,0,0
114	0.11	0.08	0.15	136,136,140	0.0	0.0	0.0	0,0,0
115	0.10	0.08	0.13	136,136,140	0.0	0.0	0.0	0,0,0
116	0.10	0.07	0.12	136,136,140	0.0	0.0	0.0	0,0,0
117	0.09	0.07	0.11	136,136,140	0.0	0.0	0.0	0,0,0
118	0.08	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
119	0.07	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
120	0.07	0.05	0.09	136,136,140	0.0	0.0	0.0	0,0,0
121	0.06	0.05	0.08	136,136,140	0.0	0.0	0.0	0,0,0
122	0.06	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
123	0.05	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
124	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
125	0.04	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
126	0.13	0.26	0.16	136,136,140	0.0	0.0	0.0	0,0,0
127	0.08	0.28	0.10	136,136,140	0.0	0.0	0.0	0,0,0
128	0.04	0.54	0.05	136,136,140	0.0	0.0	0.0	0,0,0
129	0.05	0.22	0.06	136,136,140	0.0	0.0	0.0	0,0,0
130	0.05	0.23	0.06	136,136,140	0.0	0.0	0.0	0,0,0
131	0.11	0.23	0.14	136,136,140	0.0	0.0	0.0	0,0,0
132	0.05	0.46	0.06	136,136,140	0.0	0.0	0.0	0,0,0
133	0.11	0.23	0.15	136,136,140	0.0	0.0	0.0	0,0,0
134	0.05	0.46	0.07	136,136,140	0.0	0.0	0.0	0,0,0
135	0.05	0.22	0.06	136,136,140	0.0	0.0	0.0	0,0,0
136	0.05	0.23	0.06	136,136,140	0.0	0.0	0.0	0,0,0
217	0.12	0.10	0.15	136,136,140	0.0	0.0	0.0	0,0,0
218	0.11	0.08	0.14	136,136,140	0.0	0.0	0.0	0,0,0
219	0.10	0.08	0.13	136,136,140	0.0	0.0	0.0	0,0,0
220	0.10	0.07	0.12	136,136,140	0.0	0.0	0.0	0,0,0
221	0.09	0.06	0.11	136,136,140	0.0	0.0	0.0	0,0,0
222	0.08	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
223	0.07	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
224	0.07	0.05	0.09	136,136,140	0.0	0.0	0.0	0,0,0
225	0.06	0.05	0.08	136,136,140	0.0	0.0	0.0	0,0,0
226	0.06	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
227	0.05	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
228	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
229	0.04	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
230	0.12	0.26	0.16	136,136,140	0.0	0.0	0.0	0,0,0
231	0.07	0.28	0.09	136,136,140	0.0	0.0	0.0	0,0,0
232	0.04	0.53	0.05	136,136,140	0.0	0.0	0.0	0,0,0
233	0.12	0.20	0.16	136,136,140	0.0	0.0	0.0	0,0,0
234	0.11	0.08	0.14	136,136,140	0.0	0.0	0.0	0,0,0
235	0.10	0.07	0.13	136,136,140	0.0	0.0	0.0	0,0,0
236	0.10	0.07	0.12	136,136,140	0.0	0.0	0.0	0,0,0
237	0.09	0.06	0.11	136,136,140	0.0	0.0	0.0	0,0,0
238	0.08	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
239	0.07	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
240	0.07	0.05	0.09	136,136,140	0.0	0.0	0.0	0,0,0
241	0.06	0.05	0.08	136,136,140	0.0	0.0	0.0	0,0,0
242	0.06	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
243	0.05	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
244	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
245	0.04	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
246	0.04	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
247	0.04	0.09	0.05	136,136,140	0.0	0.0	0.0	0,0,0
248	0.02	0.56	0.02	136,136,140	0.0	0.0	0.0	0,0,0
249	0.12	0.13	0.16	136,136,140	0.0	0.0	0.0	0,0,0
250	0.11	0.12	0.15	136,136,140	0.0	0.0	0.0	0,0,0
251	0.10	0.07	0.13	136,136,140	0.0	0.0	0.0	0,0,0
252	0.09	0.07	0.12	136,136,140	0.0	0.0	0.0	0,0,0
253	0.09	0.06	0.11	136,136,140	0.0	0.0	0.0	0,0,0
254	0.08	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
255	0.07	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
256	0.07	0.05	0.09	136,136,140	0.0	0.0	0.0	0,0,0
257	0.06	0.05	0.08	136,136,140	0.0	0.0	0.0	0,0,0
258	0.06	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
259	0.05	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
260	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
261	0.04	0.03	0.05	136,136,140	0.0	0.0	0.0	0,0,0
262	0.03	0.03	0.04	136,136,140	0.0	0.0	0.0	0,0,0

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
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263	0.02	0.09	0.03	136,136,140	0.0	0.0	0.0	0,0,0
264	6.19e-03	0.55	8.01e-03	136,136,140	0.0	0.0	0.0	0,0,0
265	0.13	0.14	0.16	136,136,140	0.0	0.0	0.0	0,0,0
266	0.11	0.12	0.15	136,136,140	0.0	0.0	0.0	0,0,0
267	0.10	0.07	0.13	136,136,140	0.0	0.0	0.0	0,0,0
268	0.09	0.07	0.12	136,136,140	0.0	0.0	0.0	0,0,0
269	0.09	0.07	0.11	136,136,140	0.0	0.0	0.0	0,0,0
270	0.08	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
271	0.07	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
272	0.07	0.05	0.09	136,136,140	0.0	0.0	0.0	0,0,0
273	0.06	0.05	0.08	136,136,140	0.0	0.0	0.0	0,0,0
274	0.06	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
275	0.05	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
276	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
277	0.04	0.03	0.05	136,136,140	0.0	0.0	0.0	0,0,0
278	0.03	0.03	0.05	136,136,140	0.0	0.0	0.0	0,0,0
279	0.03	0.09	0.03	136,136,140	0.0	0.0	0.0	0,0,0
280	9.63e-03	0.55	0.01	136,136,140	0.0	0.0	0.0	0,0,0
281	0.13	0.19	0.16	136,136,140	0.0	0.0	0.0	0,0,0
282	0.11	0.08	0.15	136,136,140	0.0	0.0	0.0	0,0,0
283	0.10	0.08	0.13	136,136,140	0.0	0.0	0.0	0,0,0
284	0.10	0.07	0.12	136,136,140	0.0	0.0	0.0	0,0,0
285	0.09	0.07	0.11	136,136,140	0.0	0.0	0.0	0,0,0
286	0.08	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
287	0.07	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
288	0.07	0.05	0.09	136,136,140	0.0	0.0	0.0	0,0,0
289	0.06	0.05	0.08	136,136,140	0.0	0.0	0.0	0,0,0
290	0.06	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
291	0.05	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
292	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
293	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
294	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
295	0.04	0.09	0.05	136,136,140	0.0	0.0	0.0	0,0,0
296	0.02	0.56	0.02	136,136,140	0.0	0.0	0.0	0,0,0
297	0.12	0.11	0.16	136,136,140	0.0	0.0	0.0	0,0,0
298	0.11	0.08	0.15	136,136,140	0.0	0.0	0.0	0,0,0
299	0.10	0.08	0.13	136,136,140	0.0	0.0	0.0	0,0,0
300	0.10	0.07	0.12	136,136,140	0.0	0.0	0.0	0,0,0
301	0.09	0.07	0.11	136,136,140	0.0	0.0	0.0	0,0,0
302	0.08	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
303	0.07	0.06	0.10	136,136,140	0.0	0.0	0.0	0,0,0
304	0.07	0.05	0.09	136,136,140	0.0	0.0	0.0	0,0,0
305	0.06	0.05	0.08	136,136,140	0.0	0.0	0.0	0,0,0
306	0.06	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
307	0.05	0.04	0.07	136,136,140	0.0	0.0	0.0	0,0,0
308	0.05	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
309	0.04	0.04	0.06	136,136,140	0.0	0.0	0.0	0,0,0
310	0.13	0.26	0.16	136,136,140	0.0	0.0	0.0	0,0,0
311	0.08	0.28	0.10	136,136,140	0.0	0.0	0.0	0,0,0
312	0.04	0.54	0.05	136,136,140	0.0	0.0	0.0	0,0,0
313	0.05	0.22	0.06	136,136,140	0.0	0.0	0.0	0,0,0
314	0.05	0.23	0.06	136,136,140	0.0	0.0	0.0	0,0,0
315	0.11	0.23	0.14	136,136,140	0.0	0.0	0.0	0,0,0
316	0.05	0.46	0.06	136,136,140	0.0	0.0	0.0	0,0,0
317	0.11	0.23	0.15	136,136,140	0.0	0.0	0.0	0,0,0
318	0.05	0.46	0.07	136,136,140	0.0	0.0	0.0	0,0,0
319	0.05	0.22	0.06	136,136,140	0.0	0.0	0.0	0,0,0
320	0.05	0.23	0.06	136,136,140	0.0	0.0	0.0	0,0,0

Setto	rRfck	rRfyk	rPfck	wR	wF	wP
	0.13	0.56	0.16	0.0	0.0	0.0

Guscio	rRfck	rRfyk	rPfck	Rif. cmb	wR	wF	wP	Rif. cmb
					mm	mm	mm	
1	0.03	0.13	0.04	136,136,140	0.0	0.0	0.0	0,0,0
2	0.02	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
3	0.02	0.13	0.03	136,136,140	0.0	0.0	0.0	0,0,0
4	0.02	0.08	0.02	136,136,140	0.0	0.0	0.0	0,0,0
5	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
6	0.02	0.07	0.03	136,136,140	0.0	0.0	0.0	0,0,0
7	0.02	0.09	0.03	136,136,140	0.0	0.0	0.0	0,0,0
8	0.02	0.09	0.03	136,136,140	0.0	0.0	0.0	0,0,0
9	0.02	0.07	0.03	136,136,140	0.0	0.0	0.0	0,0,0
10	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
11	0.02	0.08	0.02	136,136,140	0.0	0.0	0.0	0,0,0
12	0.02	0.13	0.03	136,136,140	0.0	0.0	0.0	0,0,0

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	254 di 288

13	0.01	0.04	0.02	136,136,140	0.0	0.0	0.0	0,0,0
14	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
15	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
16	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
17	0.02	0.10	0.03	136,136,140	0.0	0.0	0.0	0,0,0
18	0.02	0.09	0.03	136,136,140	0.0	0.0	0.0	0,0,0
19	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
20	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
21	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
22	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
23	4.09e-03	0.01	5.31e-03	136,136,140	0.0	0.0	0.0	0,0,0
24	0.01	0.06	0.01	136,136,140	0.0	0.0	0.0	0,0,0
25	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
26	0.02	0.14	0.03	136,136,140	0.0	0.0	0.0	0,0,0
27	0.02	0.08	0.03	136,136,140	0.0	0.0	0.0	0,0,0
28	0.02	0.08	0.03	136,136,140	0.0	0.0	0.0	0,0,0
29	0.02	0.14	0.03	136,136,140	0.0	0.0	0.0	0,0,0
30	0.01	0.04	0.02	136,136,140	0.0	0.0	0.0	0,0,0
31	0.01	0.05	0.01	136,136,140	0.0	0.0	0.0	0,0,0
32	4.04e-03	0.01	5.29e-03	136,136,140	0.0	0.0	0.0	0,0,0
137	4.63e-03	0.01	6.04e-03	136,136,140	0.0	0.0	0.0	0,0,0
138	0.01	0.06	0.02	136,136,140	0.0	0.0	0.0	0,0,0
139	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
140	0.02	0.15	0.03	136,136,140	0.0	0.0	0.0	0,0,0
141	0.02	0.08	0.03	136,136,140	0.0	0.0	0.0	0,0,0
142	0.02	0.08	0.03	136,136,140	0.0	0.0	0.0	0,0,0
143	0.02	0.15	0.03	136,136,140	0.0	0.0	0.0	0,0,0
144	0.01	0.04	0.02	136,136,140	0.0	0.0	0.0	0,0,0
145	0.01	0.06	0.01	136,136,140	0.0	0.0	0.0	0,0,0
146	4.59e-03	0.01	6.01e-03	136,136,140	0.0	0.0	0.0	0,0,0
147	0.01	0.04	0.01	136,136,140	0.0	0.0	0.0	0,0,0
148	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
149	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
150	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
151	0.02	0.10	0.03	136,136,140	0.0	0.0	0.0	0,0,0
152	0.02	0.10	0.03	136,136,140	0.0	0.0	0.0	0,0,0
153	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
154	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
155	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
156	0.01	0.04	0.01	136,136,140	0.0	0.0	0.0	0,0,0
157	0.02	0.12	0.03	136,136,140	0.0	0.0	0.0	0,0,0
158	0.02	0.08	0.02	136,136,140	0.0	0.0	0.0	0,0,0
159	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
160	0.02	0.07	0.03	136,136,140	0.0	0.0	0.0	0,0,0
161	0.02	0.08	0.03	136,136,140	0.0	0.0	0.0	0,0,0
162	0.02	0.08	0.03	136,136,140	0.0	0.0	0.0	0,0,0
163	0.02	0.07	0.03	136,136,140	0.0	0.0	0.0	0,0,0
164	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
165	0.02	0.08	0.02	136,136,140	0.0	0.0	0.0	0,0,0
166	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
167	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
168	0.03	0.13	0.04	136,136,140	0.0	0.0	0.0	0,0,0
169	0.03	0.14	0.04	136,136,140	0.0	0.0	0.0	0,0,0
170	0.02	0.12	0.03	136,136,140	0.0	0.0	0.0	0,0,0
171	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
172	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
173	0.02	0.12	0.03	136,136,140	0.0	0.0	0.0	0,0,0
174	0.03	0.14	0.04	136,136,140	0.0	0.0	0.0	0,0,0
175	0.03	0.13	0.04	136,136,140	0.0	0.0	0.0	0,0,0
176	0.01	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
177	0.02	0.08	0.03	136,136,140	0.0	0.0	0.0	0,0,0
178	0.03	0.10	0.03	136,136,140	0.0	0.0	0.0	0,0,0
179	0.06	0.21	0.08	136,136,140	0.0	0.0	0.0	0,0,0
180	0.06	0.19	0.07	136,136,140	0.0	0.0	0.0	0,0,0
181	0.05	0.17	0.07	136,136,140	0.0	0.0	0.0	0,0,0
182	0.05	0.17	0.07	136,136,140	0.0	0.0	0.0	0,0,0
183	0.06	0.18	0.07	136,136,140	0.0	0.0	0.0	0,0,0
184	0.06	0.20	0.08	136,136,140	0.0	0.0	0.0	0,0,0
185	0.03	0.10	0.04	136,136,140	0.0	0.0	0.0	0,0,0
186	0.02	0.08	0.02	136,136,140	0.0	0.0	0.0	0,0,0
187	0.02	0.20	0.03	136,136,140	0.0	0.0	0.0	0,0,0
188	0.03	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
189	0.03	0.09	0.04	136,136,140	0.0	0.0	0.0	0,0,0
190	0.03	0.11	0.04	136,136,140	0.0	0.0	0.0	0,0,0
191	0.03	0.15	0.05	136,136,140	0.0	0.0	0.0	0,0,0
192	0.03	0.15	0.05	136,136,140	0.0	0.0	0.0	0,0,0
193	0.03	0.11	0.04	136,136,140	0.0	0.0	0.0	0,0,0

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
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194	0.03	0.09	0.04	136,136,140	0.0	0.0	0.0	0,0,0
195	0.03	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
196	0.02	0.20	0.03	136,136,140	0.0	0.0	0.0	0,0,0
197	0.01	0.05	0.01	136,136,140	0.0	0.0	0.0	0,0,0
198	0.01	0.08	0.02	136,136,140	0.0	0.0	0.0	0,0,0
199	0.01	0.08	0.02	136,136,140	0.0	0.0	0.0	0,0,0
200	0.03	0.15	0.03	136,136,140	0.0	0.0	0.0	0,0,0
201	0.02	0.12	0.03	136,136,140	0.0	0.0	0.0	0,0,0
202	0.02	0.12	0.03	136,136,140	0.0	0.0	0.0	0,0,0
203	0.03	0.15	0.03	136,136,140	0.0	0.0	0.0	0,0,0
204	0.01	0.08	0.02	136,136,140	0.0	0.0	0.0	0,0,0
205	0.01	0.08	0.02	136,136,140	0.0	0.0	0.0	0,0,0
206	0.01	0.05	0.01	136,136,140	0.0	0.0	0.0	0,0,0
207	8.80e-03	0.03	0.01	136,136,140	0.0	0.0	0.0	0,0,0
208	0.01	0.07	0.02	136,136,140	0.0	0.0	0.0	0,0,0
209	0.01	0.07	0.02	136,136,140	0.0	0.0	0.0	0,0,0
210	0.02	0.18	0.02	136,136,140	0.0	0.0	0.0	0,0,0
211	0.02	0.10	0.03	136,136,140	0.0	0.0	0.0	0,0,0
212	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
213	0.02	0.18	0.02	136,136,140	0.0	0.0	0.0	0,0,0
214	0.01	0.07	0.02	136,136,140	0.0	0.0	0.0	0,0,0
215	0.01	0.07	0.02	136,136,140	0.0	0.0	0.0	0,0,0
216	8.87e-03	0.03	0.01	136,136,140	0.0	0.0	0.0	0,0,0
321	8.27e-03	0.03	0.01	136,136,140	0.0	0.0	0.0	0,0,0
322	0.01	0.07	0.02	136,136,140	0.0	0.0	0.0	0,0,0
323	0.01	0.07	0.02	136,136,140	0.0	0.0	0.0	0,0,0
324	0.02	0.18	0.02	136,136,140	0.0	0.0	0.0	0,0,0
325	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
326	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
327	0.02	0.18	0.02	136,136,140	0.0	0.0	0.0	0,0,0
328	0.01	0.07	0.02	136,136,140	0.0	0.0	0.0	0,0,0
329	0.01	0.08	0.02	136,136,140	0.0	0.0	0.0	0,0,0
330	8.34e-03	0.03	0.01	136,136,140	0.0	0.0	0.0	0,0,0
331	0.01	0.05	0.01	136,136,140	0.0	0.0	0.0	0,0,0
332	0.01	0.07	0.02	136,136,140	0.0	0.0	0.0	0,0,0
333	0.01	0.07	0.02	136,136,140	0.0	0.0	0.0	0,0,0
334	0.03	0.15	0.03	136,136,140	0.0	0.0	0.0	0,0,0
335	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
336	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
337	0.03	0.15	0.03	136,136,140	0.0	0.0	0.0	0,0,0
338	0.01	0.07	0.02	136,136,140	0.0	0.0	0.0	0,0,0
339	0.01	0.07	0.02	136,136,140	0.0	0.0	0.0	0,0,0
340	0.01	0.05	0.01	136,136,140	0.0	0.0	0.0	0,0,0
341	0.02	0.18	0.03	136,136,140	0.0	0.0	0.0	0,0,0
342	0.02	0.10	0.03	136,136,140	0.0	0.0	0.0	0,0,0
343	0.03	0.09	0.04	136,136,140	0.0	0.0	0.0	0,0,0
344	0.03	0.11	0.04	136,136,140	0.0	0.0	0.0	0,0,0
345	0.03	0.15	0.04	136,136,140	0.0	0.0	0.0	0,0,0
346	0.03	0.15	0.04	136,136,140	0.0	0.0	0.0	0,0,0
347	0.03	0.11	0.04	136,136,140	0.0	0.0	0.0	0,0,0
348	0.03	0.09	0.04	136,136,140	0.0	0.0	0.0	0,0,0
349	0.03	0.10	0.03	136,136,140	0.0	0.0	0.0	0,0,0
350	0.02	0.19	0.03	136,136,140	0.0	0.0	0.0	0,0,0
351	0.02	0.08	0.02	136,136,140	0.0	0.0	0.0	0,0,0
352	0.03	0.09	0.03	136,136,140	0.0	0.0	0.0	0,0,0
353	0.06	0.21	0.08	136,136,140	0.0	0.0	0.0	0,0,0
354	0.06	0.19	0.07	136,136,140	0.0	0.0	0.0	0,0,0
355	0.05	0.17	0.07	136,136,140	0.0	0.0	0.0	0,0,0
356	0.05	0.17	0.07	136,136,140	0.0	0.0	0.0	0,0,0
357	0.06	0.19	0.07	136,136,140	0.0	0.0	0.0	0,0,0
358	0.06	0.21	0.08	136,136,140	0.0	0.0	0.0	0,0,0
359	0.03	0.09	0.03	136,136,140	0.0	0.0	0.0	0,0,0
360	0.02	0.07	0.02	136,136,140	0.0	0.0	0.0	0,0,0
361	0.02	0.05	0.02	136,136,140	0.0	0.0	0.0	0,0,0
362	0.03	0.13	0.04	136,136,140	0.0	0.0	0.0	0,0,0
363	0.03	0.15	0.04	136,136,140	0.0	0.0	0.0	0,0,0
364	0.02	0.13	0.03	136,136,140	0.0	0.0	0.0	0,0,0
365	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
366	0.02	0.11	0.03	136,136,140	0.0	0.0	0.0	0,0,0
367	0.02	0.13	0.03	136,136,140	0.0	0.0	0.0	0,0,0
368	0.03	0.15	0.04	136,136,140	0.0	0.0	0.0	0,0,0

Guscio	rRfck	rRfyk	rPFck	wR	wF	wP
	0.06	0.21	0.08	0.0	0.0	0.0

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA
433

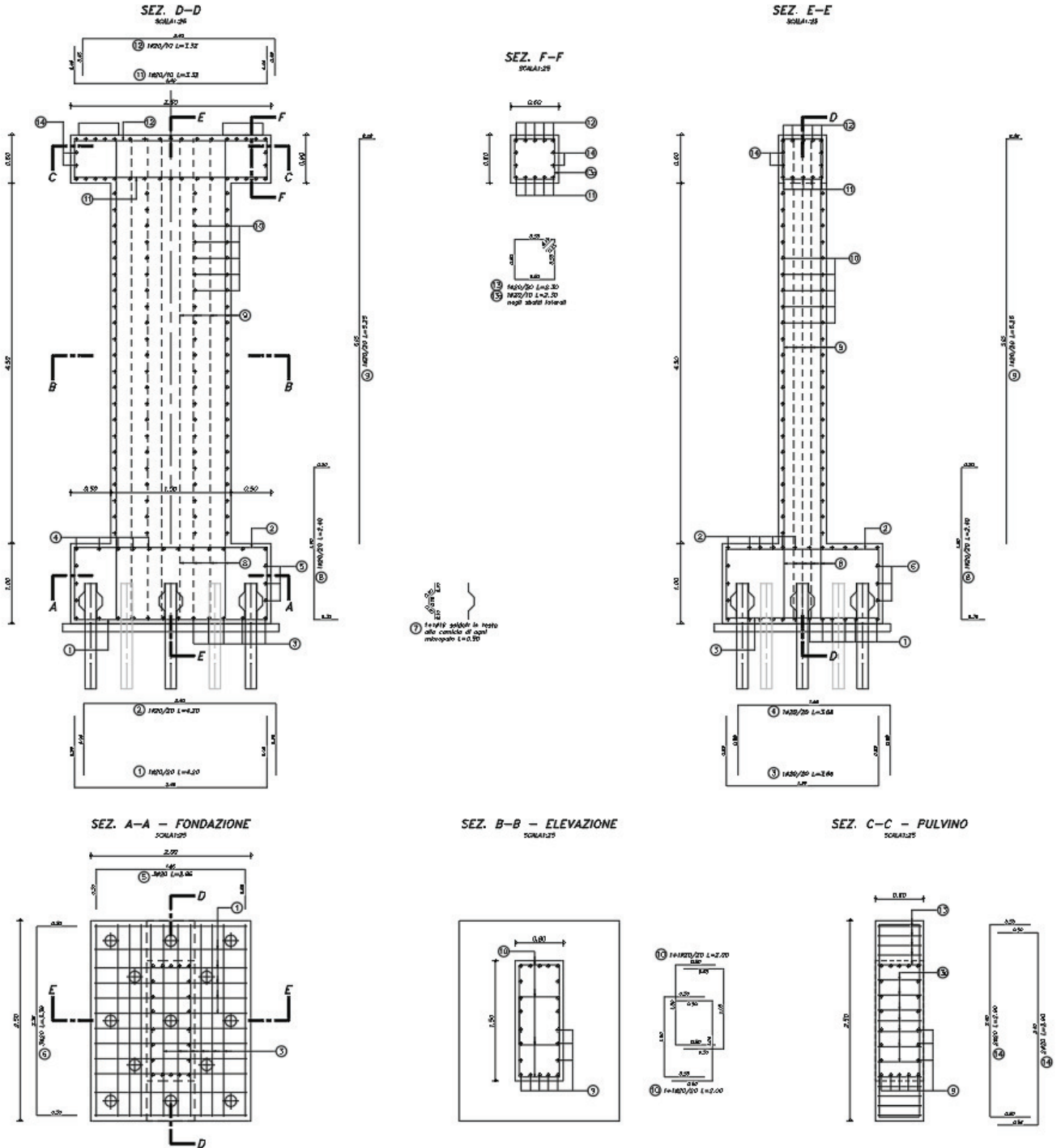
LOTTO
I-1

ELABORATO
B_1

DOCUMENTO
519_v3

REV.
1

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Armatura

Le verifiche sono tutte soddisfatte sulla base dei materiali adottati.

9 Azioni sulle fondazioni

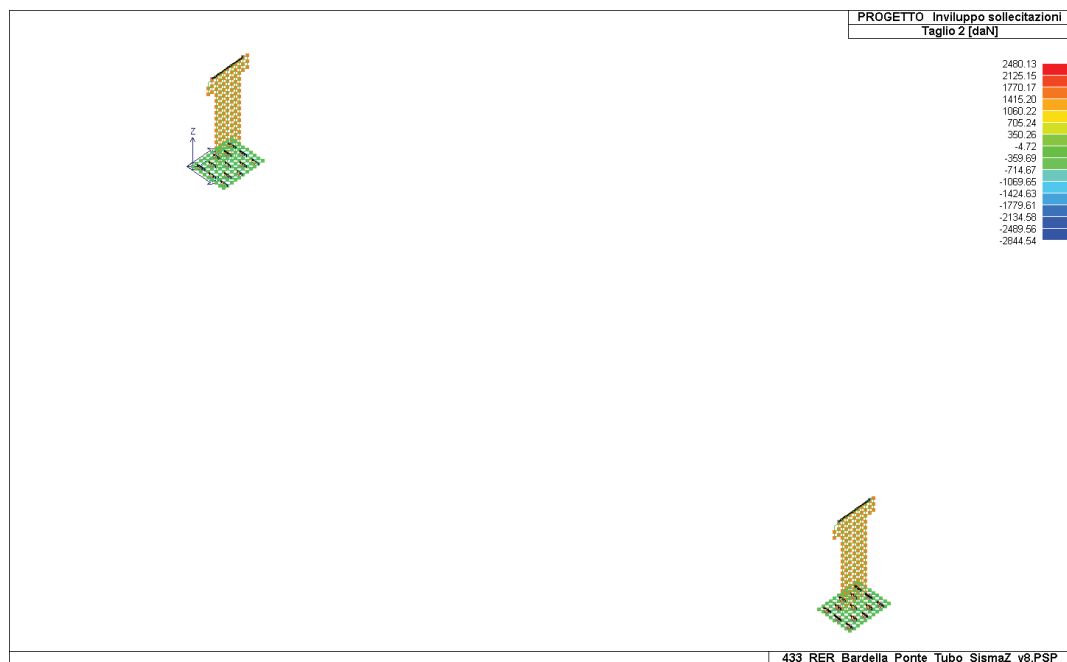
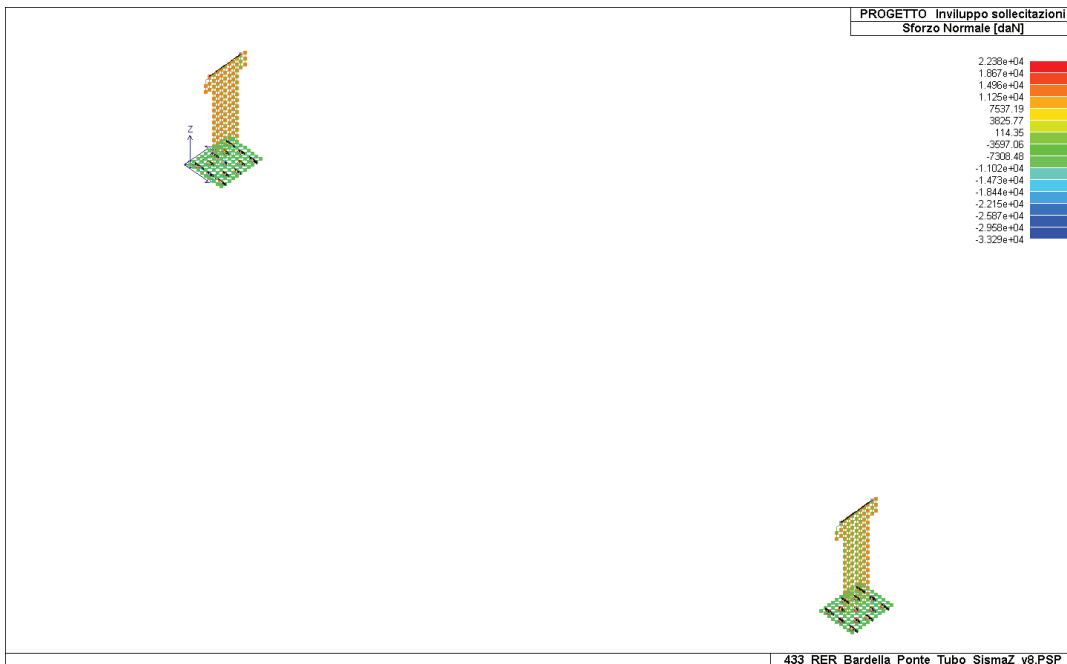
Si riportano le azioni massime sulle fondazioni in oggetto:

$$N_{SLU_max} = -332.90 \text{ kN/palo compressione}$$

$$N_{SLU_min} = +273.80 \text{ kN/palo trazione}$$

$$T_{SLU_max} = 28.77 \text{ kN/palo}$$

$$M_{SLU_max} = 10.50 \text{ kNm/palo}$$



PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
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Si riportano in forma tabella i risultati per ogni elemento palo di fondazione:

Nodo	Tipo	Palo	Cmb	Quota	Fx	Fy	Fz	Mx	My	Mz
				cm	daN	daN	daN	daN cm	daN cm	daN cm
1	P21-PALO D 21.00	1	1	-10.00	6.25	-31.77	-9503.46	1770.46	-1.331e+04	80.97
		1	2	-10.00	-22.07	-16.34	-1.053e+04	1075.14	-1.412e+04	93.72
		1	3	-10.00	4.83	-23.49	-7020.54	1309.01	-9850.53	59.88
		1	29	-10.00	2038.63	288.13	1.770e+04	3198.25	-1.457e+04	773.63
		1	36	-10.00	-2030.93	-316.81	-3.292e+04	-1405.51	-7547.28	-638.61
		1	49	-10.00	703.53	772.42	222.34	9806.80	-7.596e+04	2811.49
		1	66	-10.00	657.23	892.11	2137.77	1.238e+04	-7.408e+04	2744.21
		1	81	-10.00	760.96	99.54	1888.12	1788.09	-1.188e+04	335.27
		1	84	-10.00	-784.86	-128.24	-1.714e+04	5.84	-8785.57	-200.39
		1	91	-10.00	255.80	282.85	-4722.18	4279.39	-3.508e+04	1106.09
		1	99	-10.00	243.83	329.27	-3870.80	5199.49	-3.450e+04	1078.88
		1	133	-10.00	4.83	-23.49	-7020.54	1309.01	-9850.53	59.88
		1	134	-10.00	-11.95	-14.35	-7627.21	896.97	-1.033e+04	67.44
		1	135	-10.00	4.83	-23.49	-7020.54	1309.01	-9850.53	59.88
2	P21-PALO D 21.00	1	2	-10.00	-20.38	13.91	-7478.30	-421.62	-1.420e+04	94.03
		1	3	-10.00	5.75	-4.21	-5102.02	356.19	-9880.16	60.01
		1	4	-10.00	-22.12	15.40	-5671.17	-547.60	-1.073e+04	72.89
		1	49	-10.00	702.18	1298.88	8444.53	-1.547e+04	-7.580e+04	2811.07
		1	56	-10.00	-574.91	-1502.81	-2.167e+04	1.765e+04	4.808e+04	-2551.38
		1	57	-10.00	657.13	1517.75	1.079e+04	-1.802e+04	-7.353e+04	2686.61
		1	91	-10.00	256.02	495.23	-246.53	-5918.82	-3.505e+04	1106.06
		1	94	-10.00	-260.52	-563.18	-1.152e+04	6524.41	1.343e+04	-923.64
		1	95	-10.00	238.98	578.00	641.92	-6883.18	-3.420e+04	1058.93
		1	133	-10.00	5.75	-4.21	-5102.02	356.19	-9880.16	60.01
		1	134	-10.00	-10.77	7.41	-5439.30	-179.39	-1.038e+04	67.64
		1	135	-10.00	5.75	-4.21	-5102.02	356.19	-9880.16	60.01
		1	136	-10.00	-14.90	10.32	-5523.62	-313.28	-1.051e+04	69.55
		1	137	-10.00	5.75	-4.21	-5102.02	356.19	-9880.16	60.01
3	P21-PALO D 21.00	1	2	-10.00	-17.13	46.68	-4365.77	-2128.12	-1.448e+04	93.43
		1	3	-10.00	7.91	16.73	-3141.15	-735.24	-1.007e+04	59.63
		1	16	-10.00	1393.37	-583.68	-2.852e+04	1.109e+04	1.754e+04	-635.65
		1	17	-10.00	-1379.12	645.67	2.208e+04	-1.391e+04	-4.011e+04	770.03
		1	49	-10.00	699.14	2065.14	1.663e+04	-5.430e+04	-7.555e+04	2807.28
		1	54	-10.00	1676.65	2285.99	6454.40	-5.718e+04	-6.587e+04	2739.53
		1	74	-10.00	512.95	-201.90	-1.271e+04	3334.72	503.03	-199.36
		1	75	-10.00	-529.78	263.88	6298.61	-6149.59	-2.167e+04	333.79
		1	91	-10.00	256.35	800.81	4238.79	-2.143e+04	-3.509e+04	1104.36
		1	93	-10.00	631.66	883.39	504.63	-2.249e+04	-3.156e+04	1076.97
		1	133	-10.00	7.91	16.73	-3141.15	-735.24	-1.007e+04	59.63
		1	134	-10.00	-8.41	30.99	-3205.31	-1407.44	-1.059e+04	67.22
		1	135	-10.00	7.91	16.73	-3141.15	-735.24	-1.007e+04	59.63
		1	136	-10.00	-12.50	34.55	-3221.36	-1575.49	-1.072e+04	69.11
4	P21-PALO D 21.00	1	27	-10.00	-1703.06	-521.48	1.714e+04	1.046e+04	-2.410e+04	-664.10
		1	35	-10.00	-1702.82	-586.49	1.713e+04	1.125e+04	-2.412e+04	-641.89
		1	54	-10.00	477.97	2287.96	-9530.60	-5.735e+04	-5258.54	2738.00
		1	77	-10.00	607.98	244.12	-1.091e+04	-6281.23	-4172.39	343.15
		1	79	-10.00	-678.82	282.89	4403.00	-8884.17	-1.430e+04	408.03

PONTE-TUBO - RELAZIONE DI CALCOLO

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Nodo	Tipo	Palo	Cmb	Quota	Fx	Fy	Fz	Mx	My	Mz
		1	80	-10.00	-681.73	-175.29	4421.33	2874.64	-1.423e+04	-208.18
		1	93	-10.00	160.66	886.27	-5563.61	-2.274e+04	-7778.08	1076.56
		1	133	-10.00	-17.31	19.88	-3164.68	-1007.64	-8839.93	59.88
		1	134	-10.00	-36.87	34.41	-3242.37	-1703.29	-9201.30	67.48
		1	135	-10.00	-17.31	19.88	-3164.68	-1007.64	-8839.93	59.88
		1	136	-10.00	-41.76	38.04	-3261.80	-1877.21	-9291.65	69.39
		1	137	-10.00	-17.31	19.88	-3164.68	-1007.64	-8839.93	59.88
		1	138	-10.00	-39.32	36.23	-3252.09	-1790.25	-9246.47	68.44
		1	139	-10.00	-17.31	19.88	-3164.68	-1007.64	-8839.93	59.88
		1	140	-10.00	-36.87	34.41	-3242.37	-1703.29	-9201.30	67.48
5	P21-PALO D 21.00	1	2	-10.00	-100.13	56.05	-4404.83	-2938.58	-1.027e+04	93.81
		1	3	-10.00	-45.08	23.00	-3140.98	-1276.95	-7382.47	59.91
		1	30	-10.00	1296.75	658.62	-2.850e+04	-1.496e+04	2.245e+04	777.98
		1	35	-10.00	-1401.93	-583.07	2.201e+04	1.097e+04	-3.897e+04	-642.94
		1	43	-10.00	734.76	-2000.11	1.660e+04	5.110e+04	-7.751e+04	-2677.85
		1	54	-10.00	-734.71	2292.63	-2.543e+04	-5.776e+04	5.598e+04	2740.04
		1	81	-10.00	451.09	272.05	-1.273e+04	-6876.45	3709.52	335.18
		1	84	-10.00	-587.35	-196.49	6273.74	2886.73	-1.883e+04	-200.19
		1	88	-10.00	193.45	-732.50	4258.40	1.807e+04	-3.218e+04	-969.94
		1	93	-10.00	-317.35	890.12	-1.157e+04	-2.307e+04	1.640e+04	1077.33
		1	133	-10.00	-45.08	23.00	-3140.98	-1276.95	-7382.47	59.91
		1	134	-10.00	-68.13	37.78	-3228.43	-1994.86	-7561.44	67.49
		1	135	-10.00	-45.08	23.00	-3140.98	-1276.95	-7382.47	59.91
		1	136	-10.00	-73.90	41.47	-3250.29	-2174.34	-7606.19	69.39
		1	137	-10.00	-45.08	23.00	-3140.98	-1276.95	-7382.47	59.91
		1	138	-10.00	-71.01	39.63	-3239.36	-2084.60	-7583.81	68.44
		1	139	-10.00	-45.08	23.00	-3140.98	-1276.95	-7382.47	59.91
		1	140	-10.00	-68.13	37.78	-3228.43	-1994.86	-7561.44	67.49
6	P21-PALO D 21.00	1	2	-10.00	-103.46	26.59	-7517.65	-1493.56	-9986.58	93.40
		1	3	-10.00	-47.28	4.21	-5102.02	-356.19	-7193.12	59.63
		1	43	-10.00	737.88	-1273.63	8403.15	1.433e+04	-7.777e+04	-2681.89
		1	55	-10.00	1712.40	-1493.86	1.078e+04	1.689e+04	-6.741e+04	-2555.89
		1	58	-10.00	-1749.72	1526.91	-2.170e+04	-1.879e+04	4.802e+04	2690.33
		1	88	-10.00	193.07	-470.72	-277.29	4779.22	-3.214e+04	-971.61
		1	94	-10.00	561.74	-554.01	620.39	5748.51	-2.823e+04	-923.90
		1	95	-10.00	-702.81	587.18	-1.155e+04	-7659.58	1.352e+04	1058.29
		1	133	-10.00	-47.28	4.21	-5102.02	-356.19	-7193.12	59.63
		1	134	-10.00	-70.54	16.59	-5462.62	-955.53	-7355.15	67.19
		1	135	-10.00	-47.28	4.21	-5102.02	-356.19	-7193.12	59.63
		1	136	-10.00	-76.35	19.68	-5552.76	-1105.37	-7395.66	69.08
		1	137	-10.00	-47.28	4.21	-5102.02	-356.19	-7193.12	59.63
		1	138	-10.00	-73.45	18.13	-5507.69	-1030.45	-7375.41	68.14
		1	139	-10.00	-47.28	4.21	-5102.02	-356.19	-7193.12	59.63
		1	140	-10.00	-70.54	16.59	-5462.62	-955.53	-7355.15	67.19
7	P21-PALO D 21.00	1	1	-10.00	-65.40	-21.95	-9503.69	950.43	-9677.16	80.66
		1	2	-10.00	-105.08	-5.40	-1.057e+04	162.88	-9913.58	93.58
		1	3	-10.00	-48.16	-16.23	-7020.71	703.18	-7167.08	59.65
		1	15	-10.00	1998.42	-312.96	1.772e+04	-2040.15	-1.259e+04	-641.10
		1	18	-10.00	-2110.17	300.09	-3.298e+04	2514.31	-3484.49	775.56
		1	43	-10.00	740.82	-787.98	173.29	-8855.42	-7.810e+04	-2682.68
		1	54	-10.00	-747.91	897.86	-1.762e+04	1.177e+04	5.704e+04	2744.86
		1	74	-10.00	696.62	-123.02	1865.06	-594.36	-8696.03	-199.55
		1	75	-10.00	-839.96	110.16	-1.717e+04	1067.33	-5918.32	334.16
		1	88	-10.00	192.88	-302.81	-4800.64	-3164.35	-3.218e+04	-971.64
		1	93	-10.00	-324.53	336.38	-1.136e+04	4557.37	1.696e+04	1079.04
		1	133	-10.00	-48.16	-16.23	-7020.71	703.18	-7167.08	59.65
		1	134	-10.00	-71.67	-6.43	-7650.71	236.48	-7307.18	67.30
		1	135	-10.00	-48.16	-16.23	-7020.71	703.18	-7167.08	59.65
		1	136	-10.00	-77.55	-3.98	-7808.21	119.81	-7342.20	69.22
		1	137	-10.00	-48.16	-16.23	-7020.71	703.18	-7167.08	59.65
		1	138	-10.00	-74.61	-5.20	-7729.46	178.15	-7324.69	68.26
		1	139	-10.00	-48.16	-16.23	-7020.71	703.18	-7167.08	59.65
		1	140	-10.00	-71.67	-6.43	-7650.71	236.48	-7307.18	67.30
8	P21-PALO D 21.00	1	1	-10.00	-30.07	-26.89	-9544.01	1362.53	-1.146e+04	80.97
		1	2	-10.00	-64.06	-10.90	-1.059e+04	620.74	-1.199e+04	93.80
		1	3	-10.00	-22.03	-19.88	-7050.49	1007.64	-8489.13	59.88
		1	21	-10.00	1669.76	253.34	1.280e+04	2265.30	4350.77	798.48

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
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Nodo	Tipo	Palo	Cmb	Quota	Fx	Fy	Fz	Mx	My	Mz
		1	28	-10.00	-1722.55	-274.16	-2.811e+04	-1129.18	-2.341e+04	-663.51
		1	35	-10.00	-1707.64	-307.76	-2.777e+04	-2006.50	-2.377e+04	-646.86
		1	54	-10.00	472.68	892.19	-1657.36	1.226e+04	-4858.67	2754.36
		1	77	-10.00	602.69	88.84	7.88	1231.13	-3773.22	344.70
		1	79	-10.00	-684.13	70.05	-1.532e+04	1904.30	-1.390e+04	409.54
		1	80	-10.00	-687.03	-109.65	-1.535e+04	-95.01	-1.383e+04	-209.73
		1	93	-10.00	155.39	331.76	-5332.54	4950.45	-7379.96	1082.74
		1	133	-10.00	-22.03	-19.88	-7050.49	1007.64	-8489.13	59.88
		1	134	-10.00	-42.17	-10.41	-7671.57	568.06	-8801.52	67.48
		1	135	-10.00	-22.03	-19.88	-7050.49	1007.64	-8489.13	59.88
		1	136	-10.00	-47.20	-8.04	-7826.84	458.16	-8879.61	69.39
		1	137	-10.00	-22.03	-19.88	-7050.49	1007.64	-8489.13	59.88
		1	138	-10.00	-44.69	-9.22	-7749.21	513.11	-8840.56	68.44
		1	139	-10.00	-22.03	-19.88	-7050.49	1007.64	-8489.13	59.88
		1	140	-10.00	-42.17	-10.41	-7671.57	568.06	-8801.52	67.48
9	P21-PALO D 21.00	1	2	-10.00	-59.86	20.26	-7593.34	-958.34	-1.230e+04	93.79
		1	3	-10.00	-19.46	0.0	-5165.76	-4.75e-06	-8668.17	59.87
		1	35	-10.00	-1695.37	-448.80	-5411.32	4664.20	-2.486e+04	-644.33
		1	57	-10.00	-527.18	1507.94	-5329.27	-1.699e+04	-1.375e+04	2688.16
		1	79	-10.00	-677.46	151.73	-5526.15	-2022.26	-1.447e+04	408.71
		1	89	-10.00	157.57	498.89	-5494.68	-5971.06	-7510.67	1087.17
		1	92	-10.00	-235.92	-474.88	-5545.48	4835.25	-1.053e+04	-952.22
		1	95	-10.00	-226.54	577.42	-5506.61	-6770.22	-1.074e+04	1059.41
		1	117	-10.00	496.27	405.32	-4975.18	-5083.83	-5372.00	850.67
		1	124	-10.00	-543.50	-381.31	-6064.87	3948.02	-1.407e+04	-715.72
		1	133	-10.00	-19.46	0.0	-5165.76	-4.75e-06	-8668.17	59.87
		1	134	-10.00	-39.18	12.00	-5520.08	-567.90	-9017.92	67.47
		1	135	-10.00	-19.46	0.0	-5165.76	-4.75e-06	-8668.17	59.87
		1	136	-10.00	-44.11	15.01	-5608.66	-709.88	-9105.36	69.38
		1	137	-10.00	-19.46	0.0	-5165.76	-4.75e-06	-8668.17	59.87
		1	138	-10.00	-41.64	13.50	-5564.37	-638.89	-9061.64	68.42
		1	139	-10.00	-19.46	0.0	-5165.76	-4.75e-06	-8668.17	59.87
		1	140	-10.00	-39.18	12.00	-5520.08	-567.90	-9017.92	67.47
232	P21-PALO D 21.00	1	1	-10.00	349.36	22.65	-3855.39	-997.00	-2805.36	-80.14
		1	2	-10.00	376.91	46.71	-3963.67	-2131.33	-1928.19	-92.94
		1	3	-10.00	258.60	16.75	-2843.30	-737.62	-2084.79	-59.26
		1	5	-10.00	1645.63	645.69	2.237e+04	-1.391e+04	2.796e+04	-769.66
		1	12	-10.00	-1064.19	-583.65	-2.815e+04	1.109e+04	-3.255e+04	636.10
		1	42	-10.00	-1410.15	2286.02	6752.25	-5.719e+04	5.372e+04	-2739.17
		1	68	-10.00	1087.80	-2003.10	-2.262e+04	5.147e+04	-7.138e+04	2673.68
		1	69	-10.00	796.28	263.90	6596.46	-6151.97	9523.75	-333.43
		1	72	-10.00	-246.44	-201.87	-1.241e+04	3332.33	-1.265e+04	199.72
		1	87	-10.00	-365.16	883.42	802.48	-2.249e+04	1.941e+04	-1076.60
		1	100	-10.00	539.69	-738.81	-1.035e+04	1.861e+04	-2.606e+04	970.29
		1	133	-10.00	258.60	16.75	-2843.30	-737.62	-2084.79	-59.26
		1	134	-10.00	274.92	31.01	-2907.46	-1409.82	-1564.99	-66.85
		1	135	-10.00	258.60	16.75	-2843.30	-737.62	-2084.79	-59.26
		1	136	-10.00	279.00	34.58	-2923.51	-1577.87	-1435.04	-68.75
		1	137	-10.00	258.60	16.75	-2843.30	-737.62	-2084.79	-59.26
		1	138	-10.00	276.96	32.80	-2915.49	-1493.85	-1500.01	-67.80
		1	139	-10.00	258.60	16.75	-2843.30	-737.62	-2084.79	-59.26
		1	140	-10.00	274.92	31.01	-2907.46	-1409.82	-1564.99	-66.85
233	P21-PALO D 21.00	1	1	-10.00	349.84	-5.70	-6909.15	482.18	-2784.68	-81.35
		1	2	-10.00	377.72	13.91	-7478.30	-421.62	-1935.08	-94.24
		1	3	-10.00	258.95	-4.21	-5102.02	356.19	-2068.91	-60.16
		1	4	-10.00	286.82	15.40	-5671.17	-547.60	-1219.32	-73.05
		1	37	-10.00	-392.43	1517.75	1.079e+04	-1.802e+04	6.159e+04	-2686.76
		1	44	-10.00	1047.11	-1502.81	-2.167e+04	1.765e+04	-6.940e+04	2551.10
		1	68	-10.00	1092.16	-1283.93	-1.932e+04	1.510e+04	-7.166e+04	2675.57
		1	85	-10.00	25.72	578.00	641.92	-6883.18	2.225e+04	-1059.09
		1	88	-10.00	525.21	-563.18	-1.152e+04	6524.41	-2.538e+04	923.49
		1	100	-10.00	542.26	-480.40	-1.063e+04	5560.05	-2.623e+04	970.62
		1	133	-10.00	258.95	-4.21	-5102.02	356.19	-2068.91	-60.16
		1	134	-10.00	275.46	7.41	-5439.30	-179.39	-1565.45	-67.80
		1	135	-10.00	258.95	-4.21	-5102.02	356.19	-2068.91	-60.16
		1	136	-10.00	279.59	10.32	-5523.62	-313.28	-1439.58	-69.71
		1	137	-10.00	258.95	-4.21	-5102.02	356.19	-2068.91	-60.16

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	261 di 288

Nodo	Tipo	Palo	Cmb	Quota	Fx	Fy	Fz	Mx	My	Mz
		1	138	-10.00	277.53	8.87	-5481.46	-246.34	-1502.52	-68.75
		1	139	-10.00	258.95	-4.21	-5102.02	356.19	-2068.91	-60.16
		1	140	-10.00	275.46	7.41	-5439.30	-179.39	-1565.45	-67.80
234	P21-PALO D 21.00	1	1	-10.00	353.54	-31.81	-9905.56	1773.68	-3097.73	-80.48
		1	2	-10.00	381.86	-16.38	-1.093e+04	1078.36	-2285.66	-93.23
		1	3	-10.00	261.68	-23.52	-7318.39	1311.39	-2300.18	-59.52
		1	24	-10.00	2360.12	-316.84	-3.329e+04	-1402.57	-7461.05	639.06
		1	25	-10.00	-1772.12	288.10	1.740e+04	3200.64	2421.54	-773.26
		1	46	-10.00	-390.73	892.08	1839.92	1.238e+04	6.193e+04	-2743.84
		1	68	-10.00	1097.55	-801.12	-1.589e+04	-8012.59	-7.212e+04	2676.79
		1	78	-10.00	1051.37	-128.27	-1.744e+04	8.23	-3365.13	200.76
		1	79	-10.00	-494.45	99.52	1590.27	1790.48	-272.77	-334.90
		1	89	-10.00	22.68	329.25	-4168.65	5201.88	2.235e+04	-1078.52
		1	100	-10.00	546.20	-311.57	-1.083e+04	-2483.07	-2.657e+04	971.58
		1	133	-10.00	261.68	-23.52	-7318.39	1311.39	-2300.18	-59.52
		1	134	-10.00	278.46	-14.37	-7925.06	899.35	-1818.95	-67.07
		1	135	-10.00	261.68	-23.52	-7318.39	1311.39	-2300.18	-59.52
		1	136	-10.00	282.65	-12.09	-8076.73	796.34	-1698.65	-68.96
		1	137	-10.00	261.68	-23.52	-7318.39	1311.39	-2300.18	-59.52
		1	138	-10.00	280.55	-13.23	-8000.90	847.85	-1758.80	-68.02
		1	139	-10.00	261.68	-23.52	-7318.39	1311.39	-2300.18	-59.52
		1	140	-10.00	278.46	-14.37	-7925.06	899.35	-1818.95	-67.07
235	P21-PALO D 21.00	1	1	-10.00	389.69	-26.89	-9946.53	1362.53	-4925.84	-80.97
		1	2	-10.00	423.68	-10.90	-1.099e+04	620.74	-4398.69	-93.80
		1	3	-10.00	288.41	-19.88	-7348.65	1007.64	-3652.08	-59.88
		1	32	-10.00	2051.58	-274.16	-2.848e+04	-1129.18	8409.88	663.51
		1	33	-10.00	-1403.38	253.34	1.251e+04	2265.30	-1.649e+04	-798.48
		1	36	-10.00	-1349.95	-224.55	1.206e+04	-2904.61	-1.843e+04	834.35
		1	42	-10.00	-206.30	892.19	-1955.52	1.226e+04	-7282.54	-2754.36
		1	82	-10.00	953.41	-109.65	-1.565e+04	-95.01	1688.61	209.73
		1	83	-10.00	-336.31	88.84	-290.28	1231.13	-8367.99	-344.70
		1	84	-10.00	-333.41	-90.86	-316.41	-768.18	-8438.87	274.57
		1	87	-10.00	110.99	331.76	-5630.71	4950.45	-4761.24	-1082.74
		1	133	-10.00	288.41	-19.88	-7348.65	1007.64	-3652.08	-59.88
		1	134	-10.00	308.55	-10.41	-7969.74	568.06	-3339.69	-67.48
		1	135	-10.00	288.41	-19.88	-7348.65	1007.64	-3652.08	-59.88
		1	136	-10.00	313.59	-8.04	-8125.01	458.16	-3261.60	-69.39
		1	137	-10.00	288.41	-19.88	-7348.65	1007.64	-3652.08	-59.88
		1	138	-10.00	311.07	-9.22	-8047.37	513.11	-3300.64	-68.44
		1	139	-10.00	288.41	-19.88	-7348.65	1007.64	-3652.08	-59.88
		1	140	-10.00	308.55	-10.41	-7969.74	568.06	-3339.69	-67.48
236	P21-PALO D 21.00	1	1	-10.00	425.19	-21.91	-9905.79	947.22	-6726.29	-81.16
		1	2	-10.00	464.87	-5.37	-1.097e+04	159.66	-6489.88	-94.07
		1	3	-10.00	314.66	-16.21	-7318.56	700.80	-4983.63	-60.02
		1	6	-10.00	2376.67	300.11	-3.328e+04	2511.93	-8666.21	-775.93
		1	11	-10.00	-1669.23	-312.93	1.735e+04	-2043.10	-2422.44	640.65
		1	42	-10.00	1014.42	897.89	-1.792e+04	1.176e+04	-6.919e+04	-2745.23
		1	58	-10.00	1045.35	775.10	-1.566e+04	9329.98	-7.079e+04	-2817.19
		1	69	-10.00	1106.47	110.18	-1.746e+04	1064.94	-6232.38	-334.53
		1	72	-10.00	-430.11	-122.99	1567.20	-596.74	-3454.67	199.19
		1	87	-10.00	591.03	336.41	-1.166e+04	4554.99	-2.911e+04	-1079.40
		1	95	-10.00	602.73	289.98	-1.080e+04	3634.94	-2.971e+04	-1106.61
		1	133	-10.00	314.66	-16.21	-7318.56	700.80	-4983.63	-60.02
		1	134	-10.00	338.18	-6.41	-7948.56	234.10	-4843.53	-67.67
		1	135	-10.00	314.66	-16.21	-7318.56	700.80	-4983.63	-60.02
		1	136	-10.00	344.06	-3.95	-8106.06	117.42	-4808.50	-69.58
		1	137	-10.00	314.66	-16.21	-7318.56	700.80	-4983.63	-60.02
		1	138	-10.00	341.12	-5.18	-8027.31	175.76	-4826.01	-68.63
		1	139	-10.00	314.66	-16.21	-7318.56	700.80	-4983.63	-60.02
		1	140	-10.00	338.18	-6.41	-7948.56	234.10	-4843.53	-67.67
237	P21-PALO D 21.00	1	1	-10.00	421.55	5.70	-6909.15	-482.18	-6418.09	-80.42
		1	2	-10.00	460.80	26.59	-7517.65	-1493.56	-6144.66	-93.19
		1	3	-10.00	311.98	4.21	-5102.02	-356.19	-4755.95	-59.47
		1	38	-10.00	2014.42	1526.91	-2.170e+04	-1.879e+04	-5.997e+04	-2690.18
		1	43	-10.00	-1240.20	-1493.86	1.078e+04	1.689e+04	4.610e+04	2556.16
		1	58	-10.00	1039.90	1306.69	-1.933e+04	-1.623e+04	-7.032e+04	-2816.19
		1	85	-10.00	967.51	587.18	-1.155e+04	-7659.58	-2.547e+04	-1058.14

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	262 di 288

Nodo	Tipo	Palo	Cmb	Quota	Fx	Fy	Fz	Mx	My	Mz
		1	88	-10.00	-297.04	-554.01	620.39	5748.51	1.628e+04	924.06
		1	95	-10.00	598.85	503.89	-1.065e+04	-6690.29	-2.938e+04	-1105.84
		1	133	-10.00	311.98	4.21	-5102.02	-356.19	-4755.95	-59.47
		1	134	-10.00	335.23	16.59	-5462.62	-955.53	-4593.92	-67.04
		1	135	-10.00	311.98	4.21	-5102.02	-356.19	-4755.95	-59.47
		1	136	-10.00	341.05	19.68	-5552.76	-1105.37	-4553.41	-68.93
		1	137	-10.00	311.98	4.21	-5102.02	-356.19	-4755.95	-59.47
		1	138	-10.00	338.14	18.13	-5507.69	-1030.45	-4573.66	-67.99
		1	139	-10.00	311.98	4.21	-5102.02	-356.19	-4755.95	-59.47
		1	140	-10.00	335.23	16.59	-5462.62	-955.53	-4593.92	-67.04
238	P21-PALO D 21.00	1	1	-10.00	421.01	31.07	-3855.16	-1723.89	-6433.93	-81.50
		1	2	-10.00	459.92	56.01	-4002.73	-2935.36	-6131.90	-94.30
		1	3	-10.00	311.58	22.97	-2843.13	-1274.57	-4768.24	-60.27
		1	23	-10.00	1731.12	-583.10	2.238e+04	1.097e+04	2.396e+04	642.49
		1	26	-10.00	-1030.24	658.59	-2.821e+04	-1.495e+04	-3.460e+04	-778.34
		1	42	-10.00	1001.21	2292.61	-2.513e+04	-5.776e+04	-6.813e+04	-2740.40
		1	58	-10.00	1033.92	2075.62	-2.288e+04	-5.509e+04	-6.987e+04	-2813.39
		1	78	-10.00	853.86	-196.52	6571.59	2889.11	6681.70	199.83
		1	79	-10.00	-184.58	272.02	-1.243e+04	-6874.07	-1.586e+04	-335.54
		1	87	-10.00	583.86	890.10	-1.127e+04	-2.307e+04	-2.855e+04	-1077.69
		1	95	-10.00	596.22	808.04	-1.042e+04	-2.206e+04	-2.921e+04	-1105.29
		1	133	-10.00	311.58	22.97	-2843.13	-1274.57	-4768.24	-60.27
		1	134	-10.00	334.64	37.75	-2930.58	-1992.48	-4589.26	-67.86
		1	135	-10.00	311.58	22.97	-2843.13	-1274.57	-4768.24	-60.27
		1	136	-10.00	340.40	41.45	-2952.44	-2171.95	-4544.52	-69.75
		1	137	-10.00	311.58	22.97	-2843.13	-1274.57	-4768.24	-60.27
		1	138	-10.00	337.52	39.60	-2941.51	-2082.22	-4566.89	-68.81
		1	139	-10.00	311.58	22.97	-2843.13	-1274.57	-4768.24	-60.27
		1	140	-10.00	334.64	37.75	-2930.58	-1992.48	-4589.26	-67.86
239	P21-PALO D 21.00	1	1	-10.00	383.30	26.89	-3886.82	-1362.53	-4450.26	-80.97
		1	2	-10.00	416.31	51.40	-4017.93	-2536.45	-3840.44	-93.80
		1	3	-10.00	283.69	19.88	-2866.51	-1007.64	-3301.28	-59.88
		1	31	-10.00	2032.10	-521.48	1.751e+04	1.046e+04	9103.91	664.10
		1	34	-10.00	-1394.03	590.30	-2.336e+04	-1.386e+04	-1.644e+04	-799.07
		1	36	-10.00	-1354.82	-621.17	-2.328e+04	1.723e+04	-1.808e+04	830.37
		1	42	-10.00	-211.59	2287.96	-9232.43	-5.735e+04	-6882.66	-2738.00
		1	82	-10.00	948.11	-175.29	4719.50	2874.64	2089.00	208.18
		1	83	-10.00	-341.60	244.12	-1.061e+04	-6281.23	-7968.81	-343.15
		1	84	-10.00	-338.69	-214.07	-1.059e+04	5477.58	-8039.88	273.06
		1	87	-10.00	105.72	886.27	-5265.45	-2.274e+04	-4363.12	-1076.56
		1	133	-10.00	283.69	19.88	-2866.51	-1007.64	-3301.28	-59.88
		1	134	-10.00	303.26	34.41	-2944.21	-1703.29	-2939.90	-67.48
		1	135	-10.00	283.69	19.88	-2866.51	-1007.64	-3301.28	-59.88
		1	136	-10.00	308.15	38.04	-2963.63	-1877.21	-2849.56	-69.39
		1	137	-10.00	283.69	19.88	-2866.51	-1007.64	-3301.28	-59.88
		1	138	-10.00	305.70	36.23	-2953.92	-1790.25	-2894.73	-68.44
		1	139	-10.00	283.69	19.88	-2866.51	-1007.64	-3301.28	-59.88
		1	140	-10.00	303.26	34.41	-2944.21	-1703.29	-2939.90	-67.48
240	P21-PALO D 21.00	1	1	-10.00	383.94	0.0	-6995.43	-5.62e-06	-4425.17	-80.95
		1	2	-10.00	417.21	20.26	-7593.34	-958.34	-3834.97	-93.79
		1	3	-10.00	284.16	0.0	-5165.76	-4.14e-06	-3282.11	-59.87
		1	36	-10.00	-1344.90	-356.20	-5659.25	3228.63	-1.895e+04	832.19
		1	38	-10.00	806.48	1507.94	-5639.99	-1.699e+04	1456.66	-2692.85
		1	84	-10.00	-334.40	-127.72	-5514.01	886.45	-8381.72	273.76
		1	85	-10.00	491.24	577.42	-5506.61	-6770.22	-1211.04	-1059.41
		1	98	-10.00	500.63	-474.88	-5545.48	4835.25	-1425.11	952.22
		1	99	-10.00	107.13	498.89	-5494.68	-5971.06	-4439.61	-1087.17
		1	128	-10.00	870.46	-373.38	-6064.87	3646.47	-691.68	715.72
		1	129	-10.00	-231.57	397.39	-4975.18	-4782.28	-6578.28	-850.67
		1	133	-10.00	284.16	0.0	-5165.76	-4.14e-06	-3282.11	-59.87
		1	134	-10.00	303.88	12.00	-5520.08	-567.90	-2932.36	-67.47
		1	135	-10.00	284.16	0.0	-5165.76	-4.14e-06	-3282.11	-59.87
		1	136	-10.00	308.81	15.01	-5608.66	-709.88	-2844.92	-69.38
		1	137	-10.00	284.16	0.0	-5165.76	-4.14e-06	-3282.11	-59.87
		1	138	-10.00	306.35	13.50	-5564.37	-638.89	-2888.64	-68.42
		1	139	-10.00	284.16	0.0	-5165.76	-4.14e-06	-3282.11	-59.87
		1	140	-10.00	303.88	12.00	-5520.08	-567.90	-2932.36	-67.47

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	263 di 288

Nodo	Tipo	Palo	Cmb	Quota	Fx	Fy	Fz	Mx	My	Mz
499	P21-PALO D 21.00	1	2	-10.00	-37.18	37.69	-5447.06	-1721.91	-1.350e+04	93.03
		1	3	-10.00	-4.89	11.03	-3817.45	-479.25	-9440.87	59.36
		1	16	-10.00	1537.17	-520.24	-2.010e+04	7867.45	1.048e+04	-637.12
		1	17	-10.00	-1551.75	569.30	1.211e+04	-1.010e+04	-3.165e+04	770.96
		1	49	-10.00	82.77	1798.42	7035.70	-4.071e+04	-4.446e+04	2811.49
		1	54	-10.00	1072.59	2020.47	-220.12	-4.369e+04	-3.528e+04	2744.43
		1	74	-10.00	558.34	-181.92	-1.001e+04	2296.46	-1726.06	-200.11
		1	75	-10.00	-604.02	230.97	2049.14	-4528.03	-1.804e+04	333.96
		1	91	-10.00	14.28	695.92	128.96	-1.611e+04	-2.289e+04	1105.77
		1	93	-10.00	394.24	779.00	-2501.56	-1.721e+04	-1.955e+04	1078.64
		1	133	-10.00	-4.89	11.03	-3817.45	-479.25	-9440.87	59.36
		1	134	-10.00	-22.84	24.53	-3980.40	-1115.79	-9881.28	66.93
		1	135	-10.00	-4.89	11.03	-3817.45	-479.25	-9440.87	59.36
		1	136	-10.00	-27.33	27.90	-4021.14	-1274.92	-9991.38	68.82
		1	137	-10.00	-4.89	11.03	-3817.45	-479.25	-9440.87	59.36
		1	138	-10.00	-25.09	26.21	-4000.77	-1195.35	-9936.33	67.87
		1	139	-10.00	-4.89	11.03	-3817.45	-479.25	-9440.87	59.36
		1	140	-10.00	-22.84	24.53	-3980.40	-1115.79	-9881.28	66.93
500	P21-PALO D 21.00	1	2	-10.00	-78.72	44.34	-5466.56	-2297.93	-1.139e+04	94.46
		1	3	-10.00	-31.40	15.47	-3817.37	-863.91	-8097.74	60.31
		1	30	-10.00	1474.87	652.85	-2.009e+04	-1.518e+04	1.366e+04	779.63
		1	35	-10.00	-1549.21	-594.16	1.208e+04	1.211e+04	-3.180e+04	-643.70
		1	43	-10.00	146.90	-1748.64	7022.11	3.830e+04	-4.787e+04	-2682.05
		1	54	-10.00	-132.26	2025.12	-1.621e+04	-4.410e+04	2.555e+04	2745.49
		1	81	-10.00	527.98	264.76	-1.002e+04	-6680.51	-114.04	336.09
		1	84	-10.00	-633.43	-206.07	2038.62	3614.07	-1.662e+04	-200.17
		1	88	-10.00	-19.28	-642.68	146.04	1.352e+04	-2.147e+04	-971.19
		1	93	-10.00	-79.97	783.75	-8556.23	-1.762e+04	4392.26	1079.68
		1	133	-10.00	-31.40	15.47	-3817.37	-863.91	-8097.74	60.31
		1	134	-10.00	-52.73	29.35	-3991.95	-1533.22	-8367.48	67.96
		1	135	-10.00	-31.40	15.47	-3817.37	-863.91	-8097.74	60.31
		1	136	-10.00	-58.06	32.82	-4035.59	-1700.55	-8434.92	69.87
		1	137	-10.00	-31.40	15.47	-3817.37	-863.91	-8097.74	60.31
		1	138	-10.00	-55.39	31.08	-4013.77	-1616.88	-8401.20	68.92
		1	139	-10.00	-31.40	15.47	-3817.37	-863.91	-8097.74	60.31
		1	140	-10.00	-52.73	29.35	-3991.95	-1533.22	-8367.48	67.96
501	P21-PALO D 21.00	1	1	-10.00	-48.93	-14.50	-8673.15	621.04	-1.040e+04	80.59
		1	2	-10.00	-85.61	3.29	-9578.71	-224.97	-1.080e+04	93.41
		1	3	-10.00	-35.98	-10.73	-6406.49	459.50	-7704.06	59.60
		1	15	-10.00	1843.77	-349.88	9218.66	-319.36	-4435.50	-641.26
		1	18	-10.00	-1928.04	349.50	-2.308e+04	236.59	-1.285e+04	775.63
		1	43	-10.00	147.43	-907.93	-3939.06	-3545.53	-4.790e+04	-2682.37
		1	59	-10.00	132.21	-1073.24	-2801.65	-3620.11	-4.709e+04	-2609.81
		1	74	-10.00	647.02	-133.02	-902.00	-121.27	-6026.08	-199.73
		1	75	-10.00	-762.45	132.65	-1.298e+04	37.58	-9850.12	334.12
		1	88	-10.00	-22.26	-344.19	-5898.71	-1334.85	-2.121e+04	-971.73
		1	96	-10.00	-28.02	-406.70	-5468.66	-1362.76	-2.090e+04	-944.30
		1	133	-10.00	-35.98	-10.73	-6406.49	459.50	-7704.06	59.60
		1	134	-10.00	-57.71	-0.18	-6943.12	-41.84	-7938.10	67.20
		1	135	-10.00	-35.98	-10.73	-6406.49	459.50	-7704.06	59.60
		1	136	-10.00	-63.15	2.45	-7077.28	-167.18	-7996.61	69.10
		1	137	-10.00	-35.98	-10.73	-6406.49	459.50	-7704.06	59.60
		1	138	-10.00	-60.43	1.14	-7010.20	-104.51	-7967.35	68.15
		1	139	-10.00	-35.98	-10.73	-6406.49	459.50	-7704.06	59.60
		1	140	-10.00	-57.71	-0.18	-6943.12	-41.84	-7938.10	67.20
502	P21-PALO D 21.00	1	1	-10.00	-13.08	-21.33	-8673.05	1195.18	-1.222e+04	81.24
		1	2	-10.00	-44.07	-4.31	-9558.95	413.58	-1.290e+04	94.08
		1	3	-10.00	-9.46	-15.78	-6406.41	883.66	-9047.18	60.08
		1	29	-10.00	1850.14	339.72	9211.70	745.28	-4732.41	774.11
		1	36	-10.00	-1874.64	-351.08	-2.305e+04	94.79	-1.558e+04	-638.70
		1	49	-10.00	83.18	906.94	-3910.05	3759.81	-4.447e+04	2811.68
		1	54	-10.00	1074.08	1067.98	4992.92	3961.08	-3.539e+04	2744.58
		1	81	-10.00	679.82	124.48	-887.93	561.73	-7611.58	335.61
		1	84	-10.00	-735.48	-135.85	-1.297e+04	279.24	-1.129e+04	-200.23
		1	91	-10.00	11.32	339.13	-5850.44	1694.66	-2.263e+04	1106.32
		1	93	-10.00	391.72	401.07	-2360.15	1726.39	-1.933e+04	1079.17
		1	133	-10.00	-9.46	-15.78	-6406.41	883.66	-9047.18	60.08

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	264 di 288

Nodo	Tipo	Palo	Cmb	Quota	Fx	Fy	Fz	Mx	My	Mz
		1	134	-10.00	-27.83	-5.69	-6931.40	420.49	-9451.88	67.69
		1	135	-10.00	-9.46	-15.78	-6406.41	883.66	-9047.18	60.08
		1	136	-10.00	-32.42	-3.16	-7062.64	304.70	-9553.06	69.59
		1	137	-10.00	-9.46	-15.78	-6406.41	883.66	-9047.18	60.08
		1	138	-10.00	-30.13	-4.43	-6997.02	362.59	-9502.47	68.64
		1	139	-10.00	-9.46	-15.78	-6406.41	883.66	-9047.18	60.08
		1	140	-10.00	-27.83	-5.69	-6931.40	420.49	-9451.88	67.69
503	P21-PALO D 21.00	1	1	-10.00	370.46	-21.35	-8941.16	1196.57	-3915.05	-81.15
		1	2	-10.00	401.45	-4.33	-9827.07	414.97	-3232.11	-93.99
		1	3	-10.00	274.19	-15.79	-6605.02	884.69	-2904.64	-60.02
		1	24	-10.00	2201.63	-351.09	-2.330e+04	96.07	816.14	638.78
		1	25	-10.00	-1585.41	339.70	9013.10	746.31	-7219.42	-774.04
		1	42	-10.00	-809.35	1067.96	4794.32	3962.11	2.343e+04	-2744.52
		1	68	-10.00	507.25	-918.30	-1.023e+04	-2920.03	-4.220e+04	2676.33
		1	78	-10.00	1000.21	-135.86	-1.317e+04	280.28	-659.64	200.30
		1	79	-10.00	-415.09	124.46	-1086.53	562.77	-4340.24	-335.54
		1	87	-10.00	-126.99	401.06	-2558.76	1727.43	7376.72	-1079.11
		1	100	-10.00	331.71	-350.51	-8210.96	-852.65	-1.568e+04	971.01
		1	133	-10.00	274.19	-15.79	-6605.02	884.69	-2904.64	-60.02
		1	134	-10.00	292.56	-5.70	-7130.00	421.52	-2499.94	-67.62
		1	135	-10.00	274.19	-15.79	-6605.02	884.69	-2904.64	-60.02
		1	136	-10.00	297.15	-3.18	-7261.24	305.73	-2398.76	-69.52
		1	137	-10.00	274.19	-15.79	-6605.02	884.69	-2904.64	-60.02
		1	138	-10.00	294.85	-4.44	-7195.62	363.63	-2449.35	-68.57
		1	139	-10.00	274.19	-15.79	-6605.02	884.69	-2904.64	-60.02
		1	140	-10.00	292.56	-5.70	-7130.00	421.52	-2499.94	-67.62
504	P21-PALO D 21.00	1	1	-10.00	406.31	-14.49	-8941.27	619.65	-5731.23	-80.67
		1	2	-10.00	442.99	3.31	-9846.82	-226.36	-5336.28	-93.50
		1	3	-10.00	300.71	-10.72	-6605.10	458.46	-4247.77	-59.66
		1	6	-10.00	2192.77	349.51	-2.328e+04	235.56	896.32	-775.69
		1	11	-10.00	-1516.78	-349.86	8973.35	-320.64	-1.033e+04	641.18
		1	39	-10.00	340.05	-1073.22	-3155.94	-3621.96	2.577e+04	2609.70
		1	58	-10.00	423.74	907.54	-1.007e+04	3463.85	-3.928e+04	-2816.74
		1	69	-10.00	1027.17	132.66	-1.318e+04	36.55	-2101.71	-334.19
		1	72	-10.00	-382.29	-133.00	-1100.60	-122.30	-5925.75	199.66
		1	86	-10.00	292.74	-406.69	-5667.26	-1363.80	8948.96	944.23
		1	95	-10.00	357.90	343.84	-8186.13	1250.13	-1.728e+04	-1106.19
		1	133	-10.00	300.71	-10.72	-6605.10	458.46	-4247.77	-59.66
		1	134	-10.00	322.44	-0.17	-7141.72	-42.88	-4013.73	-67.26
		1	135	-10.00	300.71	-10.72	-6605.10	458.46	-4247.77	-59.66
		1	136	-10.00	327.88	2.46	-7275.88	-168.21	-3955.22	-69.16
		1	137	-10.00	300.71	-10.72	-6605.10	458.46	-4247.77	-59.66
		1	138	-10.00	325.16	1.15	-7208.80	-105.54	-3984.47	-68.21
		1	139	-10.00	300.71	-10.72	-6605.10	458.46	-4247.77	-59.66
		1	140	-10.00	322.44	-0.17	-7141.72	-42.88	-4013.73	-67.26
505	P21-PALO D 21.00	1	1	-10.00	400.12	20.91	-4903.85	-1167.07	-5198.28	-81.64
		1	2	-10.00	436.10	44.32	-5198.45	-2296.54	-4743.10	-94.55
		1	3	-10.00	296.13	15.46	-3618.77	-862.87	-3854.08	-60.38
		1	23	-10.00	1876.20	-594.18	1.233e+04	1.211e+04	1.703e+04	643.62
		1	26	-10.00	-1210.14	652.84	-1.989e+04	-1.518e+04	-2.561e+04	-779.69
		1	42	-10.00	396.99	2025.10	-1.601e+04	-4.410e+04	-3.750e+04	-2745.56
		1	58	-10.00	413.40	1807.29	-1.489e+04	-4.136e+04	-3.841e+04	-2818.08
		1	78	-10.00	898.16	-206.08	2237.22	3615.10	4669.10	200.11
		1	79	-10.00	-263.26	264.75	-9823.91	-6679.47	-1.184e+04	-336.16
		1	87	-10.00	344.69	783.74	-8357.62	-1.762e+04	-1.634e+04	-1079.75
		1	95	-10.00	350.90	701.37	-7931.34	-1.658e+04	-1.669e+04	-1107.17
		1	133	-10.00	296.13	15.46	-3618.77	-862.87	-3854.08	-60.38
		1	134	-10.00	317.45	29.34	-3793.35	-1532.18	-3584.34	-68.02
		1	135	-10.00	296.13	15.46	-3618.77	-862.87	-3854.08	-60.38
		1	136	-10.00	322.78	32.80	-3836.99	-1699.51	-3516.91	-69.94
		1	137	-10.00	296.13	15.46	-3618.77	-862.87	-3854.08	-60.38
		1	138	-10.00	320.12	31.07	-3815.17	-1615.85	-3550.63	-68.98
		1	139	-10.00	296.13	15.46	-3618.77	-862.87	-3854.08	-60.38
		1	140	-10.00	317.45	29.34	-3793.35	-1532.18	-3584.34	-68.02
506	P21-PALO D 21.00	1	1	-10.00	364.27	14.93	-4903.96	-649.14	-3382.11	-80.18
		1	2	-10.00	394.56	37.70	-5178.94	-1723.30	-2638.92	-92.94
		1	3	-10.00	269.62	11.04	-3618.85	-480.28	-2510.96	-59.30

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
433	I-1	B_1	519_v3	1	265 di 288

Nodo	Tipo	Palo	Cmb	Quota	Fx	Fy	Fz	Mx	My	Mz
		1	5	-10.00	1816.48	569.31	1.231e+04	-1.010e+04	1.970e+04	-770.90
		1	12	-10.00	-1210.19	-520.23	-1.985e+04	7866.17	-2.524e+04	637.20
		1	42	-10.00	-807.86	2020.49	-21.51	-4.369e+04	2.333e+04	-2744.37
		1	68	-10.00	497.03	-1749.32	-1.472e+04	3.847e+04	-4.134e+04	2677.80
		1	69	-10.00	868.75	230.99	2247.75	-4529.07	6084.67	-333.90
		1	72	-10.00	-293.61	-181.91	-9811.35	2295.43	-1.023e+04	200.18
		1	87	-10.00	-129.51	779.01	-2302.95	-1.721e+04	7602.60	-1078.58
		1	100	-10.00	324.69	-646.85	-7891.16	1.388e+04	-1.508e+04	971.99
		1	133	-10.00	269.62	11.04	-3618.85	-480.28	-2510.96	-59.30
		1	134	-10.00	287.57	24.54	-3781.80	-1116.82	-2070.55	-66.86
		1	135	-10.00	269.62	11.04	-3618.85	-480.28	-2510.96	-59.30
		1	136	-10.00	292.06	27.91	-3822.54	-1275.95	-1960.44	-68.75
		1	137	-10.00	269.62	11.04	-3618.85	-480.28	-2510.96	-59.30
		1	138	-10.00	289.81	26.23	-3802.17	-1196.39	-2015.50	-67.81
		1	139	-10.00	269.62	11.04	-3618.85	-480.28	-2510.96	-59.30
		1	140	-10.00	287.57	24.54	-3781.80	-1116.82	-2070.55	-66.86
Nodo					Fx	Fy	Fz	Mx	My	Mz
					-2110.17	-2003.10	-3.329e+04	-5.776e+04	-7.810e+04	-2818.08
					2376.67	2292.63	2.238e+04	5.147e+04	6.193e+04	2811.68

10 Deformate

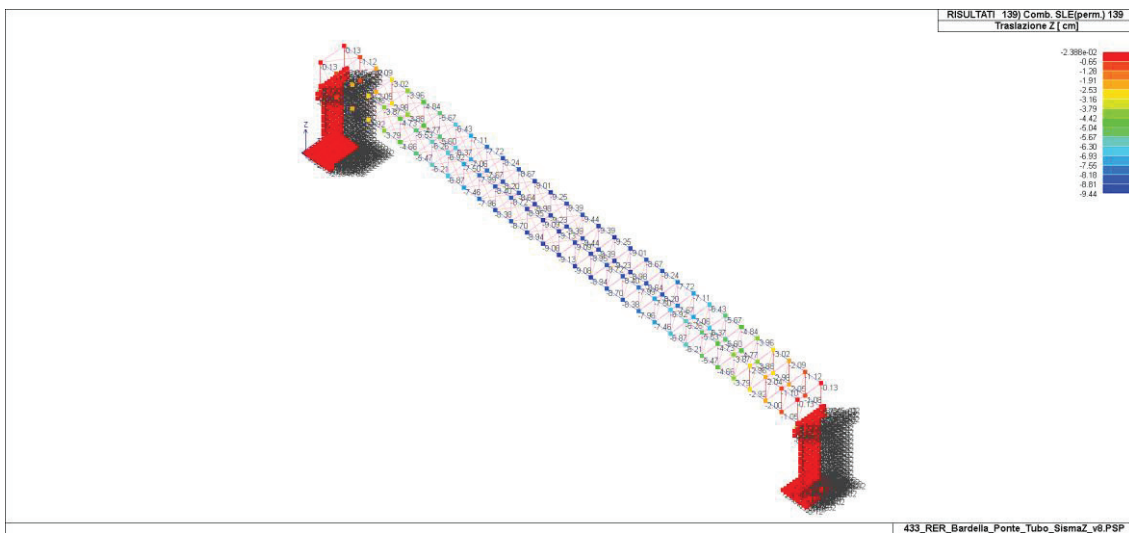
Si riportano le massime deformate per i carichi permanenti e per i carichi accidentali:

Peso proprio e permanente

$$F_{SLE_Pp+Cp} = 9.44 \text{ cm} < F_{amm_Pp_Cp}$$

$$L_c = 40.50 \text{ m}$$

$$F_{amm_Pp_Cp} = 1/150 L_c = 27.00 \text{ cm}$$

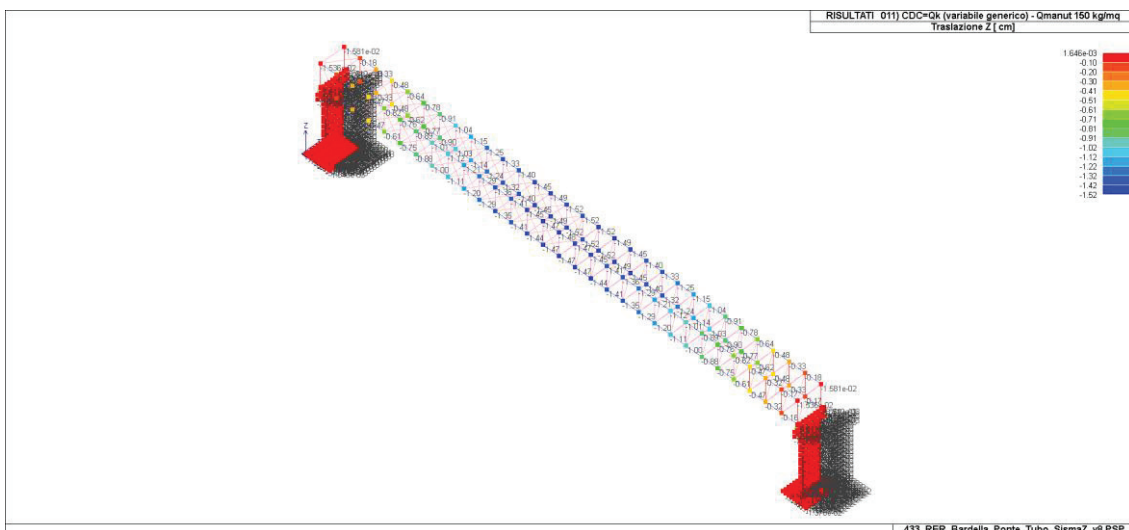


Carichi accidentali (operatori manutenzione)

$$F_{SLE_Cacc} = 1.52 \text{ cm} < F_{amm_Cacc}$$

$$L_c = 40.50 \text{ m}$$

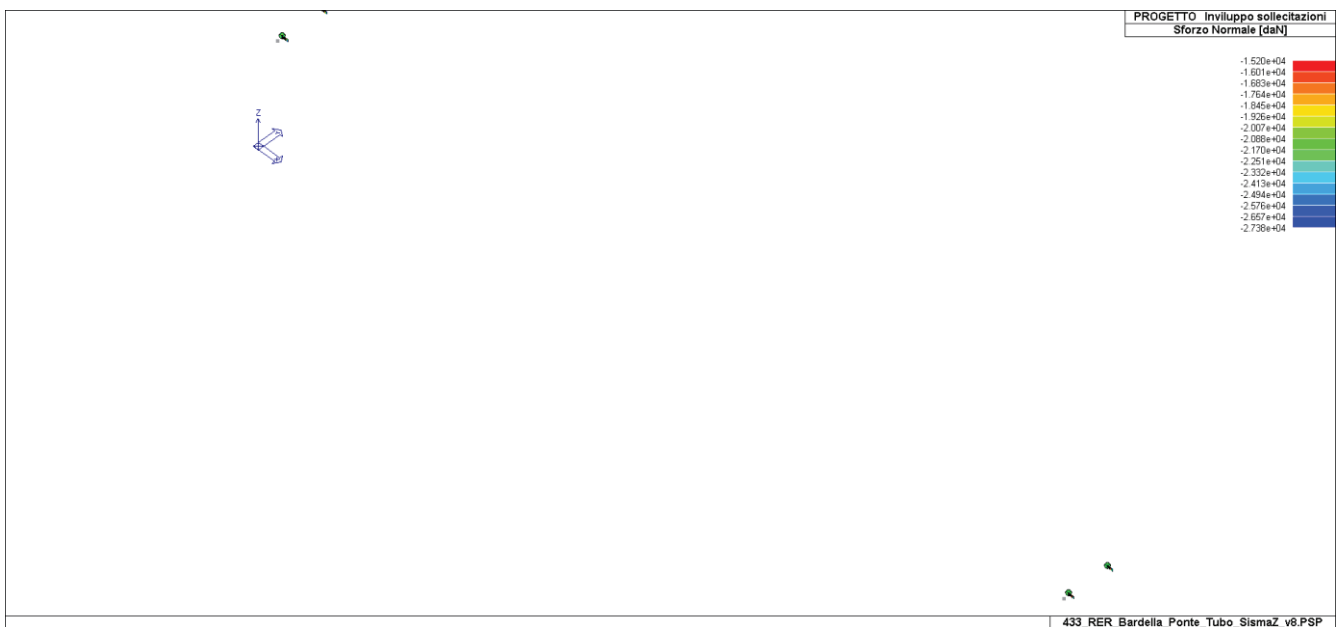
$$F_{amm_Cacc} = 1/500 L_c = 8.10 \text{ cm}$$



Le deformate sono ammissibili.

11 Appoggi

Si riportano le azioni massime sugli appoggi in progetto:



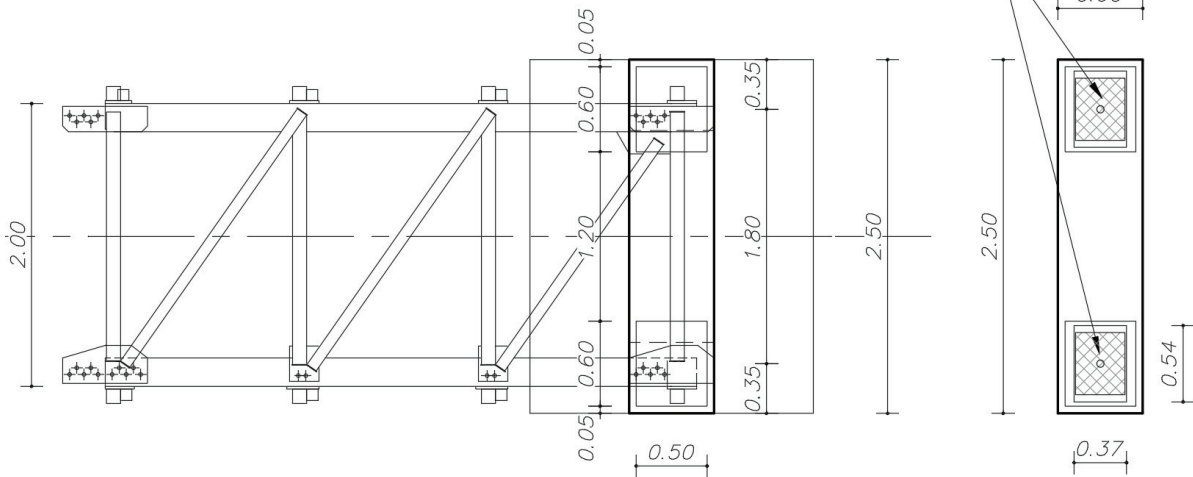
$$N_{SLU_max} = 273.80 \text{ kN} < N_{max_amm}$$

$$T_{SLU_max} = 128.7 \text{ kN} < T_{max_amm}$$

PIANTA PUVINO

SCALA 1:50

Appoggi in neoprene armato tipo EF HIGH 125-13

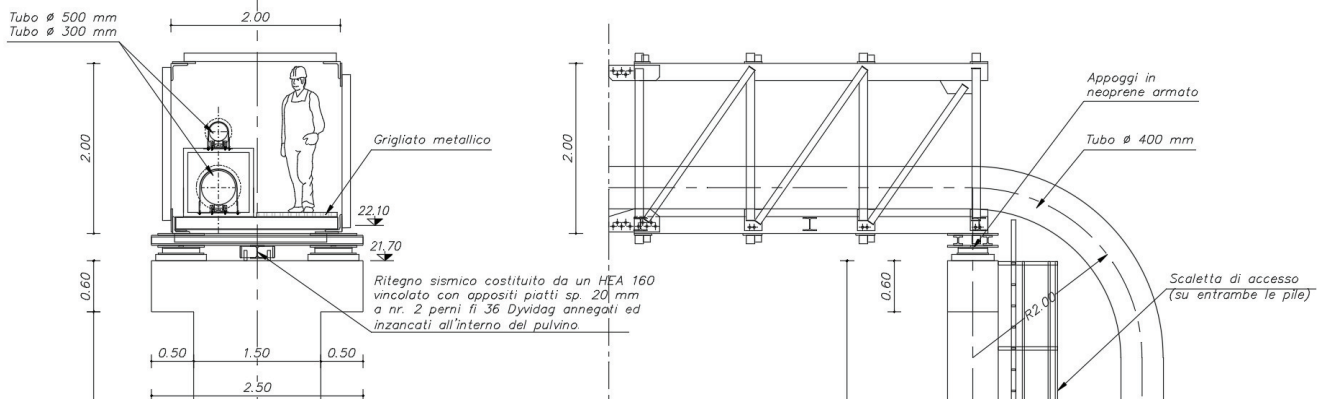


PROSPETTO FRONTALE PILA

SCALA 1:50

PROSPETTO LATERALE PILA

SCALA 1:50



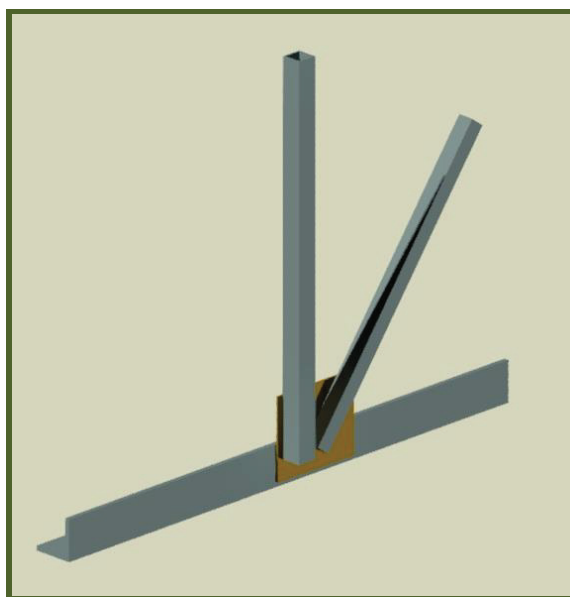
Si adottano appoggi tipo FIP "EF High 125-13" :

$$N_{\max_amm} = 1250 \text{ kN}$$

$$T_{\max_amm} = 130 \text{ kN}$$

12 Verifica nodo caratteristico della reticolare

Si verifica (in accordo con EC3) il nodo caratteristico della reticolare metallica costituita da profili e piatti in acciaio S355.



Elementi collegati - Quote

Elemento	Profili	Altezza	Larghezza	Spessore anima	Spessore ala	Raggio raccordo	Materiali	ID
Profilo principale	L200X24	200mm	200mm	24mm	24mm	18mm	S355 W	9
Trave secondaria a 1	TUBO 100x10	100mm	100mm	10mm	10mm	15mm	S355 W	4
Trave secondaria a 2	TUBO 80x8	80mm	80mm	8mm	8mm	12mm	S355 W	6

Elementi collegati - Proprietà

Proprietà	Profilo principale	Trave secondaria 1	Trave secondaria 2
Area sezione	0.01m ²	0m ²	0m ²
Asse forte area di taglio	0m ²	0m ²	0m ²
Asse forte momento d'inerzia	5284cm ⁴	462cm ⁴	189cm ⁴
Asse forte modulo elastico	373.6cm ³	92.4cm ³	47.3cm ³
Asse forte modulo plastico	0cm ³	116cm ³	59.5cm ³
Asse debole modulo plastico	0cm ³	116cm ³	59.5cm ³

Forze di progetto

Nome caso	M	N	V
C01	0kNm	473.3kN	0kN
C02	0kNm	-214.4kN	0kN
C03	0kNm	279kN	0kN
C04	0kNm	251.4kN	0kN

Forze di progetto

Nome caso	M	N	V
D01	0kNm	473.3kN	0kN
D02	0kNm	-214.4kN	0kN
D04	0kNm	251.4kN	0kN
D04	0kNm	279kN	0kN

Spessore saldature

Nome saldatura	Spessore
Giunto controvento 1 - Piatto di rinforzo	12mm
Giunto controvento 2 - Piatto di rinforzo	12mm
Giunto piatto di rinforzo - Colonna	15mm

Giunto elemento 1

Condizioni

Spessore minimo di saldatura

$$3 \text{ mm} \leq a$$

$$3 \text{ mm} \leq 12 \text{ mm}$$

OK

Lunghezza minima di saldatura

$$\max(30 \text{ mm}; 6 * a) \leq l_{\text{eff}}$$

$$72 \text{ mm} \leq 276 \text{ mm}$$

OK

Verifica delle saldature - NOME CASO: C01 + D01

$$F_{w,Ed} \leq F_{w,Rd}$$

$$N_{Ed} \leq n_{Obj} * n_w * f_{vw,d} * a * l_{\text{eff}}$$

$$473.3 \text{ kN} \leq 2 * 1 * 233.7 \text{ N/mm}^2 * 12 \text{ mm} * 276 \text{ mm}$$

$$473.3 \text{ kN} \leq 1547.7 \text{ kN}$$

$$30.58 \%$$

OK

Verifica controventi

Verifica a snervamento per compressione - NOME CASO: C02 + D02

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$214.4\text{kN} \leq 1 * 0\text{m}^2 * 355\text{N/mm}^2 / 1$$

$$214.4\text{kN} \leq 1239\text{kN}$$

17.3 %

OK

Verifica a snervamento per trazione - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$473.3\text{kN} \leq 1 * 0\text{m}^2 * 355\text{N/mm}^2 / 1$$

$$473.3\text{kN} \leq 1239\text{kN}$$

38.2 %

OK

Verifica a trazione ultima - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{u,Rd}$$

$$N_{Ed} \leq 0.9 * n_{Obj} * A_{net} * f_u / \gamma_{M2}$$

$$473.3\text{kN} \leq 0.9 * 1 * 0\text{m}^2 * 510\text{N/mm}^2 / 1.25$$

$$473.3\text{kN} \leq 1281.5\text{kN}$$

36.93 %

OK

Verifiche fazzoletto

Verifica a snervamento per compressione - NOME CASO: C02 + D02

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$214.4\text{kN} \leq 1 * 0\text{m}^2 * 275\text{N/mm}^2 / 1$$

$$214.4\text{kN} \leq 1227.6\text{kN}$$

17.46 %

OK

Verifica Backling Compressione - NOME CASO: C02 + D02

$$N_{Ed} \leq N_{b,Rd}$$

$$N_{Ed} \leq \chi * A * f_y / \gamma_{M1}$$

$$214.4\text{kN} \leq 0.95 * 0\text{m}^2 * 275\text{N/mm}^2 / 1$$

$$214.4\text{kN} \leq 713.4\text{kN}$$

30.05 %

OK

Verifica a snervamento per trazione - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$473.3\text{kN} \leq 1 * 0\text{m}^2 * 275\text{N/mm}^2 / 1$$

$$473.3\text{kN} \leq 1227.6\text{kN}$$

38.55 %

OK

Verifica a trazione ultima - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{u,Rd}$$

$$N_{Ed} \leq 0.9 * n_{Obj} * A_{net} * f_u / \gamma_{M2}$$

$$473.3\text{kN} \leq 0.9 * 1 * 0\text{m}^2 * 430\text{N/mm}^2 / 1.25$$

$$473.3\text{kN} \leq 1382.1\text{kN}$$

34.25 %

OK

Giunto elemento 2

Condizioni

Spessore minimo di saldatura

$$3 \text{ mm} \leq a$$

$$3 \text{ mm} \leq 12 \text{ mm}$$

OK

Lunghezza minima di saldatura

$$\max(30 \text{ mm}; 6 * a) \leq l_{\text{eff}}$$

$$72 \text{ mm} \leq 406 \text{ mm}$$

OK

Verifica delle saldature - NOME CASO: C01 + D01

$$F_{w,Ed} \leq F_{w,Rd}$$

$$N_{Ed} \leq n_{Obj} * n_w * f_{vw,d} * a * l_{\text{eff}}$$

$$473.3 \text{ kN} \leq 2 * 1 * 233.7 \text{ N/mm}^2 * 12 \text{ mm} * 406 \text{ mm}$$

$$473.3 \text{ kN} \leq 2276.8 \text{ kN}$$

$$20.79 \%$$

OK

Verifica controventi

Verifica a snervamento per compressione - NOME CASO: C02 + D02

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$214.4 \text{ kN} \leq 1 * 0 \text{ m}^2 * 355 \text{ N/mm}^2 / 1$$

$$214.4 \text{ kN} \leq 795.2 \text{ kN}$$

$$26.96 \%$$

OK

Verifica a snervamento per trazione - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$473.3 \text{ kN} \leq 1 * 0 \text{ m}^2 * 355 \text{ N/mm}^2 / 1$$

$$473.3 \text{ kN} \leq 795.2 \text{ kN}$$

$$59.52 \%$$

OK

Verifica a trazione ultima - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{u,Rd}$$

$$N_{Ed} \leq 0.9 * n_{Obj} * A_{\text{net}} * f_u / \gamma_{M2}$$

$$473.3 \text{ kN} \leq 0.9 * 1 * 0 \text{ m}^2 * 510 \text{ N/mm}^2 / 1.25$$

$$473.3 \text{ kN} \leq 822.5 \text{ kN}$$

$$57.54 \%$$

OK

Verifiche fazzoletto

Verifica a snervamento per compressione - NOME CASO: C02 + D02

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$214.4\text{kN} \leq 1 * 0.01\text{m}^2 * 275\text{N/mm}^2 / 1$$

$$214.4\text{kN} \leq 1585.4\text{kN}$$

$$13.52 \%$$

OK

Verifica Backling Compressione - NOME CASO: C02 + D02

$$N_{Ed} \leq N_{b,Rd}$$

$$N_{Ed} \leq \chi * A * f_y / \gamma_{M1}$$

$$214.4\text{kN} \leq 0.87 * 0\text{m}^2 * 275\text{N/mm}^2 / 1$$

$$214.4\text{kN} \leq 620.8\text{kN}$$

$$34.54 \%$$

OK

Verifica a snervamento per trazione - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$473.3\text{kN} \leq 1 * 0.01\text{m}^2 * 275\text{N/mm}^2 / 1$$

$$473.3\text{kN} \leq 1585.4\text{kN}$$

$$29.85 \%$$

OK

Verifica a trazione ultima - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{u,Rd}$$

$$N_{Ed} \leq 0.9 * n_{Obj} * A_{net} * f_u / \gamma_{M2}$$

$$473.3\text{kN} \leq 0.9 * 1 * 0.01\text{m}^2 * 430\text{N/mm}^2 / 1.25$$

$$473.3\text{kN} \leq 1784.9\text{kN}$$

$$26.52 \%$$

OK

Giunto elemento principale

Condizioni

Spessore minimo di saldatura

$$3 \text{ mm} \leq a$$

$$3\text{mm} \leq 15\text{mm}$$

OK

Lunghezza minima di saldatura

$$\max(30\text{mm}; 6 * a) \leq l_{eff}$$

$$90\text{mm} \leq 453.45\text{mm}$$

OK

Verifica delle saldature - NOME CASO: C01 + D01

$$\sigma_{eq} \leq f_u / (\beta_w * \gamma_{Mw})$$

$$\text{SQRT}(\sigma_{perp}^2 + 3 * (T_{perp}^2 + T_{parall}^2)) \leq f_u / (\beta_w * \gamma_{Mw})$$

$$\text{SQRT}((167.2\text{N/mm}^2)^2 + 3 * ((167.2\text{N/mm}^2)^2 + (20.2\text{N/mm}^2)^2)) \leq 430\text{N/mm}^2 / (0.85 * 1.25)$$

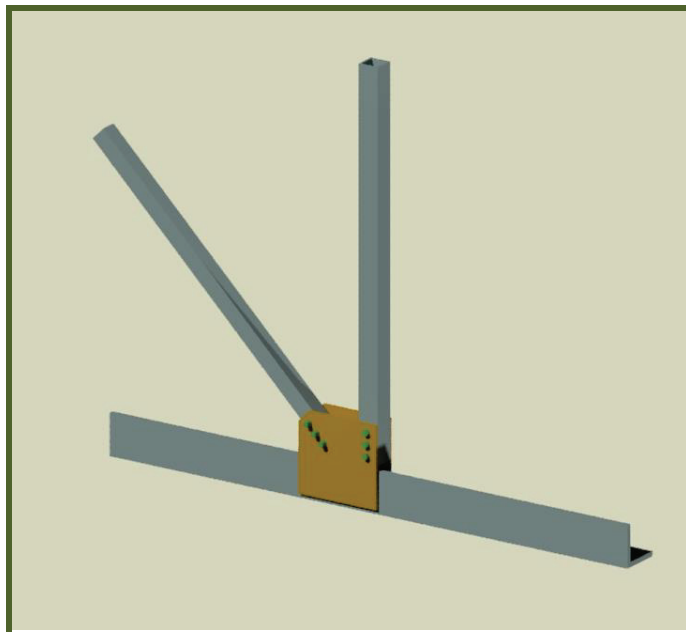
$$336.3\text{N/mm}^2 \leq 404.7\text{N/mm}^2$$

$$83.1 \%$$

OK

Il giunto è calcolato correttamente per resistere ai carichi applicati.

Si riporta quindi la verifica (in accordo con EC3) del giunto bullonato:



Elementi collegati - Quote

Elemento	Profili	Altezza	Larghezza	Spessore anima	Spessore ala	Raggio raccordo	Materiali	ID
Profilo principale	L200X24	200mm	200mm	24mm	24mm	18mm	S355 W	9
Trave secondari a 1	TUBO 100x10	100mm	100mm	10mm	10mm	15mm	S355 W	4
Trave secondari a 2	TUBO 80x8	80mm	80mm	8mm	8mm	12mm	S355 W	6

Elementi collegati - Proprietà

Proprietà	Profilo principale	Trave secondaria 1	Trave secondaria 2
Area sezione	0.01m ²	0m ²	0m ²
Asse forte area di taglio	0m ²	0m ²	0m ²
Asse forte momento d'inerzia	5284cm ⁴	462cm ⁴	189cm ⁴
Asse forte modulo elastico	373.6cm ³	92.4cm ³	47.3cm ³
Asse forte modulo plastico	0cm ³	116cm ³	59.5cm ³
Asse debole modulo plastico	0cm ³	116cm ³	59.5cm ³

Forze di progetto

Nome caso	M	N	V

C01	0kNm	473.3kN	0kN
C02	0kNm	-214.4kN	0kN
C03	0kNm	279kN	0kN
C04	0kNm	251.4kN	0kN

Forze di progetto

Nome caso	M	N	V
D01	0kNm	473.3kN	0kN
D02	0kNm	-214.4kN	0kN
D04	0kNm	251.4kN	0kN
D04	0kNm	279kN	0kN

Spessore saldature

Nome saldatura	Spessore
Giunto controvento 1 - Piatto di rinforzo	10mm
Giunto controvento 2 - Piatto di rinforzo	10mm

Giunto elemento 1

Condizioni

Spessore minimo di saldatura

$$3 \text{ mm} \leq a$$

$$3 \text{ mm} \leq 10 \text{ mm}$$

OK

Lunghezza minima di saldatura

$$\max(30 \text{ mm}; 6 * a) \leq l_{\text{eff}}$$

$$60 \text{ mm} \leq 170 \text{ mm}$$

OK

Verifica delle saldature - NOME CASO: C01 + D01

$$F_{w,Ed} \leq F_{w,Rd}$$

$$N_{Ed} \leq n_{Obj} * n_w * f_{vw,d} * a * l_{\text{eff}}$$

$$473.3 \text{ kN} \leq 2 * 1 * 233.7 \text{ N/mm}^2 * 10 \text{ mm} * 170 \text{ mm}$$

$$473.3 \text{ kN} \leq 794.4 \text{ kN}$$

$$59.58 \%$$

OK

	PROGETTO EUROPEO "INIWAS": ADEGUAMENTO DELL'IDROVIA FERRARESE AL TRAFFICO DI V CLASSE EUROPEA - I LOTTO/ 1 STRALCIO DEMOLIZIONE E RICOSTRUZIONE DEL PONTE BARDELLA SUL CANALE BOICELLI Progetto esecutivo					
	PONTE-TUBO - RELAZIONE DI CALCOLO	COMMESSA 433	LOTTO I-1	ELABORATO B_1	DOCUMENTO 519_v3	REV. 1

Verifica controventi

Verifica a snervamento per compressione - NOME CASO: C02 + D02

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$214.4kN \leq 1 * 0m^2 * 355N/mm^2 / 1$$

$$214.4kN \leq 1239kN$$

$$17.3 \%$$

OK

Verifica a snervamento per trazione - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$473.3kN \leq 1 * 0m^2 * 355N/mm^2 / 1$$

$$473.3kN \leq 1239kN$$

$$38.2 \%$$

OK

Verifica a trazione ultima - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{u,Rd}$$

$$N_{Ed} \leq 0.9 * n_{Obj} * A_{net} * f_u / \gamma_{M2}$$

$$473.3kN \leq 0.9 * 1 * 0m^2 * 510N/mm^2 / 1.25$$

$$473.3kN \leq 1215.4kN$$

$$38.94 \%$$

OK

Verifiche fazzoletto

Verifica a snervamento per compressione - NOME CASO: C02 + D02

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$214.4kN \leq 2 * 0m^2 * 275N/mm^2 / 1$$

$$214.4kN \leq 838.3kN$$

$$25.58 \%$$

OK

Verifica Buckling Compressione - NOME CASO: C02 + D02

$$N_{Ed} \leq N_{b,Rd}$$

$$N_{Ed} \leq \chi * A * f_y / \gamma_{M1}$$

$$214.4kN \leq 0.84 * 0m^2 * 275N/mm^2 / 1$$

$$214.4kN \leq 321.5kN$$

$$66.69 \%$$

OK

Verifica a snervamento per trazione - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$473.3kN \leq 2 * 0m^2 * 275N/mm^2 / 1$$

$$473.3kN \leq 838.3kN$$

$$56.46 \%$$

OK

Verifica a trazione ultima - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{u,Rd}$$

$$N_{Ed} \leq 0.9 * n_{Obj} * A_{net} * f_u / \gamma_{M2}$$

$$473.3\text{kN} \leq 0.9 * 2 * 0\text{m}^2 * 430\text{N/mm}^2 / 1.25$$

$$473.3\text{kN} \leq 810\text{kN}$$

$$58.43 \%$$

OK

Giunto elemento 2

Condizioni

Spessore minimo di saldatura

$$3 \text{ mm} \leq a$$

$$3\text{mm} \leq 10\text{mm}$$

OK

Lunghezza minima di saldatura

$$\max(30\text{mm}; 6 * a) \leq l_{\text{eff}}$$

$$60\text{mm} \leq 170\text{mm}$$

OK

Verifica delle saldature - NOME CASO: C01 + D01

$$F_{w,Ed} \leq F_{w,Rd}$$

$$N_{Ed} \leq n_{\text{Obj}} * n_w * f_{vw,d} * a * l_{\text{eff}}$$

$$473.3\text{kN} \leq 2 * 1 * 233.7\text{N/mm}^2 * 10\text{mm} * 170\text{mm}$$

$$473.3\text{kN} \leq 794.4\text{kN}$$

$$59.58 \%$$

OK

Verifica controventi

Verifica a snervamento per compressione - NOME CASO: C02 + D02

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{\text{Obj}} * A * f_y / \gamma_{M0}$$

$$214.4\text{kN} \leq 1 * 0\text{m}^2 * 355\text{N/mm}^2 / 1$$

$$214.4\text{kN} \leq 795.2\text{kN}$$

$$26.96 \%$$

OK

Verifica a snervamento per trazione - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{\text{Obj}} * A * f_y / \gamma_{M0}$$

$$473.3\text{kN} \leq 1 * 0\text{m}^2 * 355\text{N/mm}^2 / 1$$

$$473.3\text{kN} \leq 795.2\text{kN}$$

$$59.52 \%$$

OK

Verifica a trazione ultima - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{u,Rd}$$

$$N_{Ed} \leq 0.9 * n_{\text{Obj}} * A_{\text{net}} * f_u / \gamma_{M2}$$

$$473.3\text{kN} \leq 0.9 * 1 * 0\text{m}^2 * 510\text{N/mm}^2 / 1.25$$

$$473.3\text{kN} \leq 769.7\text{kN}$$

$$61.5 \%$$

OK

	PROGETTO EUROPEO "INIWAS": ADEGUAMENTO DELL'IDROVIA FERRARESE AL TRAFFICO DI V CLASSE EUROPEA - I LOTTO/ 1 STRALCIO DEMOLIZIONE E RICOSTRUZIONE DEL PONTE BARDELLA SUL CANALE BOICELLI Progetto esecutivo					
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Verifiche fazzoletto

Verifica a snervamento per compressione - NOME CASO: C02 + D02

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$214.4kN \leq 2 * 0m^2 * 275N/mm^2 / 1$$

$$214.4kN \leq 838.3kN$$

$$25.58 \%$$

OK

Verifica Backling Compressione - NOME CASO: C02 + D02

$$N_{Ed} \leq N_{b,Rd}$$

$$N_{Ed} \leq \chi * A * f_y / \gamma_{M1}$$

$$214.4kN \leq 0.66 * 0m^2 * 275N/mm^2 / 1$$

$$214.4kN \leq 405.3kN$$

$$52.9 \%$$

OK

Verifica a snervamento per trazione - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{pl,Rd}$$

$$N_{Ed} \leq n_{Obj} * A * f_y / \gamma_{M0}$$

$$473.3kN \leq 2 * 0m^2 * 275N/mm^2 / 1$$

$$473.3kN \leq 838.3kN$$

$$56.46 \%$$

OK

Verifica a trazione ultima - NOME CASO: C01 + D01

$$N_{Ed} \leq N_{u,Rd}$$

$$N_{Ed} \leq 0.9 * n_{Obj} * A_{net} * f_u / \gamma_{M2}$$

$$473.3kN \leq 0.9 * 2 * 0m^2 * 430N/mm^2 / 1.25$$

$$473.3kN \leq 810kN$$

$$58.43 \%$$

OK

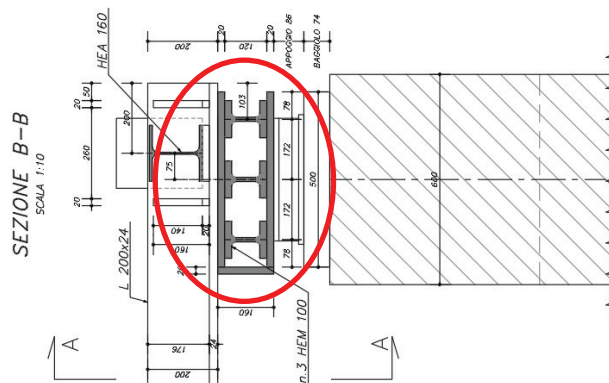
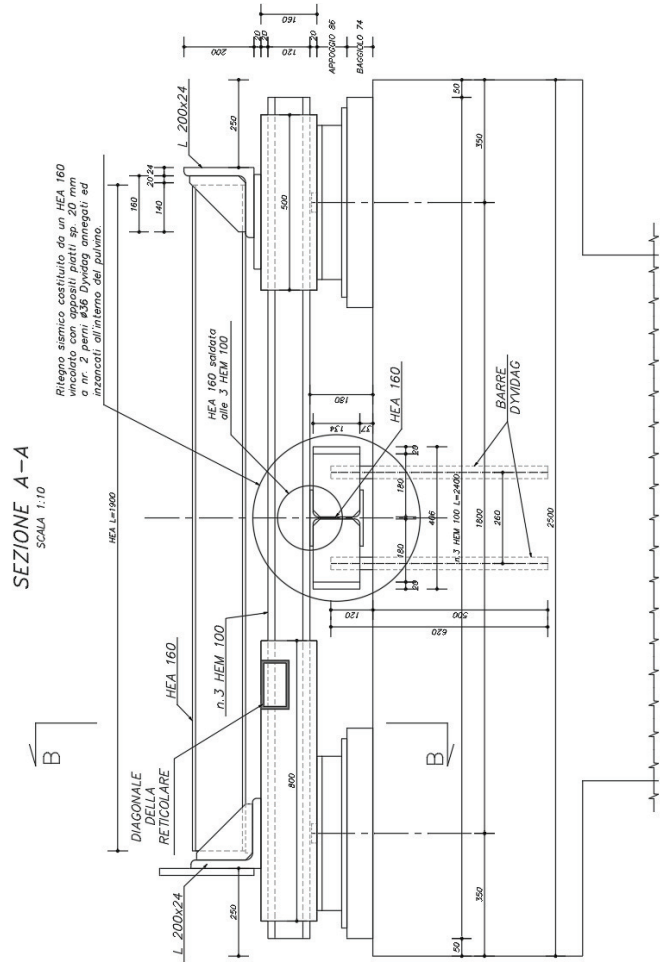
Il giunto è calcolato correttamente per resistere ai carichi applicati.

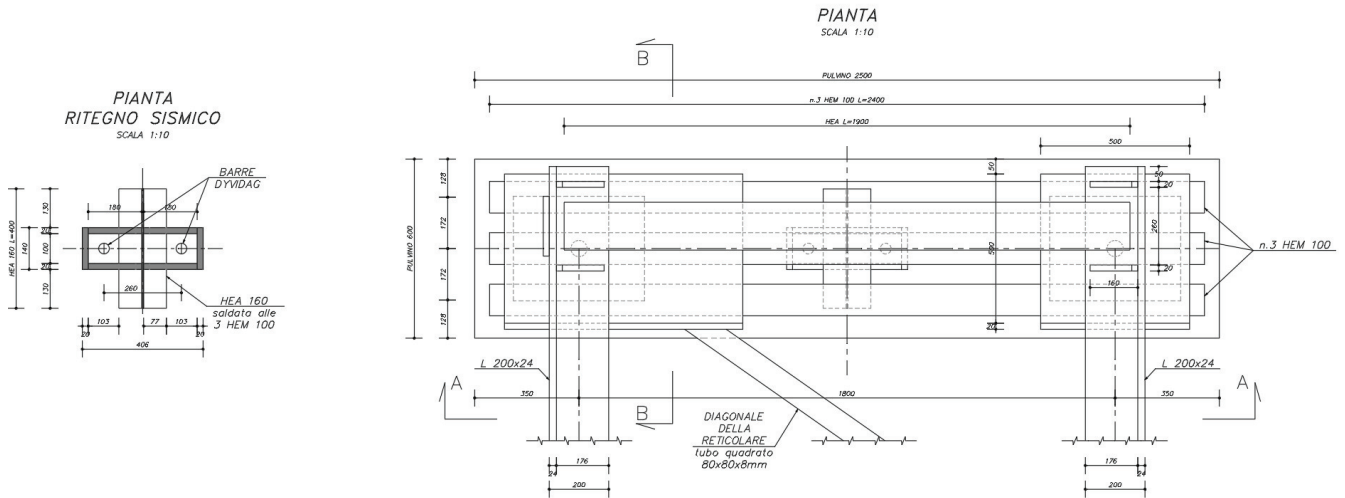
PONTE-TUBO - RELAZIONE DI CALCOLO

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13 Traverso di appoggio

Si realizza un traverso di appoggio costituito da n. 3 HEM100 S355. A favore di sicurezza si verifica il traverso come costituito da n.2 HEM100 S355.





Si riportano le azioni massime agenti sugli appoggi in progetto con eccentricità massima pari a 0.20 m :

$$T_{SLU_max_trav} = 273.80 \text{ kN/n.2 HEM100}$$

$$M_{SLU_max_trav} = 273.80 \times 0.20 \text{ m} = 55 \text{ kNm/n.2 HEM100}$$

Seguono le verifiche :

Doppio T Laminati - F1 per aiuto

File Tipo Profilo Collegamenti Giunto Flangiato AcciaioCIs Normativa: NTC ?

IPE IPN HEAA HL
 HEA IPEA HEX UB
 HEB IPEO HD UC
 HEM IPEX HP W

Ordina per: Wy ly g

Acciaio: S355 (Fe510) fy (N/mm2): 355 fu: 510

Lunghezze di libera inflessione [m]: I_{0y} 0 I_{0z} 0

N_{sd} [kN]: 0

designation	g (Kg/m)	h (mm)	b (mm)	tw (mm)	tf (mm)	r1 (mm)
HE 100 M	41,8	120	106	12,00	20,00	12,00
HE 120 M	52,1	140	126	12,50	21,00	12,00
HE 140 M	63,2	160	146	13,00	22,00	12,00
HE 160 M	76,2	180	166	14,00	23,00	15,00
HE 180 M	88,9	200	186	14,50	24,00	15,00
HE 200 M	103,0	220	206	15,00	25,00	18,00
HE 220 M	117,0	240	226	15,50	26,00	19,00

Plotta

HE 100 M

$N_{by,Rd}$ [kN]: 1 800

$N_{bz,Rd}$ [kN]: 1 800

$V_{ply,Rd}$ [kN]: 352,1

g (Kg/m): 41,8

h (mm): 120

b (mm): 106

tw (mm): 12

tf (mm): 20

r1 (mm): 12

r2 (mm): 0

A (cm2): 53,24

ly (cm4): 1 143

Wy (cm3): 190,4

Wpl,y (cm3): 235,8

$M_{oy,Rd}$ [kNm]: 79,72

$M_{oz,Rd}$ [kNm]: 39,32

$V_{plz,Rd}$ [kN]: 827,6

iy (cm): 4,63

lz (cm4): 399,2

Wz (cm3): 75,31

Wpl,z (cm3): 116,3

iz (cm): 2,74

IT (cm4): 68,21

Iw (cm6): 9 930

Classe Sezione

Compressione: 1

Flessione My: 1

Flessione Mz: 1

Presso-Flessione: 1

Verifiche

n.2 HEM100

$W = 190.40 \text{ cmc}$

S355

$f_y = 3550 \text{ daN/cm}^2$

$\gamma_s = 1.05$

$\sigma_{amm} = f_y / \gamma_s = 3380 \text{ daN/cm}^2$

$\tau_{amm} = f_y / \gamma_s / (3^{0.5}) = 1952 \text{ daN/cm}^2$

$T_{rd} = 2 \times [(12.0 - 2.0 \times 2) \times 1.2] \times \tau_{amm} = 374.78 \text{ kN/ n.2 HEM100} > 273.80 \text{ kN}$

Verificato

$M_{rd} = 2 \times W \times \sigma_{amm} = 128.71 \text{ kNm/ n.2 HEM100} > 55.00 \text{ kNm}$

Verificato

Il traverso è verificato.

14 Verifica micropalo – Azioni verticali

Di seguito si riportano le verifiche dei micropali in oggetto:

$\varnothing_e = 139.7 \text{ mm}$

$S = 10 \text{ mm}$

$L = 20.00 \text{ m}$

$\varnothing_{\text{foro}} = 210.0 \text{ mm}$

$N_{\text{vert_SLU_max}} = -335.40 \text{ kN} / +226.50 \text{ kN}$

$H_{\text{orizz_SLU_max}} = 28.77 \text{ kN}$

$M_{\text{SLU_max}} = 10.50 \text{ kNm}$

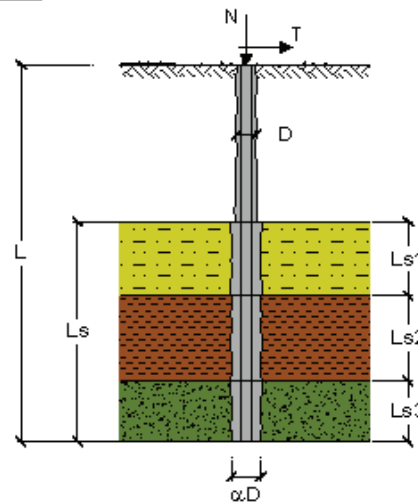
CAPACITA' PORTANTE DI UN MICROPALO

OPERA: 433 - VER - SLU max

DATI DI INPUT:

Sollecitazioni Agenti:

	Permanenti	Temporanee	Calcolo
N (kN)	125,00	115,00	335,00
T (kN)	10,50	10,10	28,80



coefficienti parziali			azioni		resistenza laterale	
Metodo di calcolo			permanenti	variabili	γ_s	$\gamma_{s \text{ max}}$
SLU	A1+M1+R1	<input type="radio"/>	1,30	1,50	1,00	1,00
	A2+M1+R2	<input type="radio"/>	1,00	1,30	1,45	1,60
	A1+M1+R3	<input checked="" type="radio"/>	1,30	1,50	1,15	1,25
	SISMA	<input type="radio"/>	1,00	1,00	1,15	1,25
DM88			1,00	1,00	1,00	1,00
definiti dal progettista			1,10	1,20	1,30	1,30

n	1	2	3	4	5	7	≥10	DM88	prog.
ξ_3	1,70	1,65	1,60	1,55	1,50	1,45	1,40	1,00	1,00
ξ_4	1,70	1,55	1,48	1,42	1,34	1,28	1,21	1,00	1,00

Caratteristiche del micropalo:

Diametro di perforazione del micropalo (D): 0,21 (m)

Lunghezza del micropalo (L): 20,00 (m)

Armatura:

IPE INP HEA HEB HEM Tubi ALTRO

ø139,7 x 10,0

Area dell'armatura (A_{arm}): 4075 (mm²)

Momento di inerzia della sezione di armatura (J_{arm}): 8,619E+06 (mm⁴)

Modulo di resistenza della sezione di armatura (W_{arm}): 123 392 (mm³)

Tipo di acciaio

Tensione di snervamento dell'acciaio (f_y): 355 (N/mm²)

Coefficiente Parziale Acciaio γ_M: 1,05

Tensione ammissibile dell'acciaio (σ_{lim}): 338 (N/mm²)

Modulo di elasticità dell'acciaio (E_{arm}): 210 000 (N/mm²)

Coefficiente di Reazione Laterale:

Coeff. di Winkler (k): 12,0 (MN/m²)

CAPACITA' PORTANTE ESTERNA

Capacità portante di fusto

$$Ql = \sum \alpha^2 Ds_j \cdot s_j \cdot \alpha_j$$

Tipo di Terreno	Spessore s _j (m)	α	Ds _j = α ² D (m)	s _j media (MPa)	s _j minima (MPa)	s _j calcolo (MPa)	Qs _j (kN)
argilla limosa	8,50	1,10	0,23	0,025	0,025	0,013	78,88
sabbie argillose	21,00	1,10	0,23	0,050	0,050	0,028	389,77
sabbie limose	6,00	1,10	0,23	0,100	0,100	0,051	222,72

$$Ls = 35,50 \text{ (m)} \quad Ql = 691,37 \text{ (kN)}$$

Capacità portante di punta

$$Qp = \%Punta \cdot Ql \text{ (consigliato 10-15\%)}$$

$$\%Punta = 10\% \quad Qp = 69,14 \text{ (kN)}$$

CARICO LIMITE DEL MICROPALO

$$Qlim = Qb + Ql$$

$$Qlim = 760,51 \text{ (kN)}$$

COEFFICIENTE DI SICUREZZA

$$Fs = Qlim / N \text{ (Fs > 1)}$$

$$Fs = 2,27$$

CAPACITA' PORTANTE PER INSTABILITA' DELL'EQUILIBRIO ELASTICO

Reaz. Laterale per unità di lunghezza e di spostam.(β) (β = k²D_{arm}): 1,68 (N/mm²)

$$Pk = 2^2 (\beta^2 E_{arm} J_{arm})^{0,5}$$

$$Pk = 348382 \text{ (MN)}$$

$$\eta = Pk / N \text{ (consigliato } \eta > 10)$$

$$\eta = 10,40$$

VERIFICA ALLE FORZE ORIZZONTALI

Momento massimo per carichi orizzontali (M):
(Ipotesi di palo con testa impedita di ruotare)

$$M = T / (2 \cdot b)$$

$$b = 4 \sqrt{\frac{k \cdot D}{4 \cdot E_{arm} \cdot J_{arm}}}$$

$$b = 0,768 \text{ (1/m)}$$

Momento Massimo (M):

$$M = 18,75 \text{ (kN m)}$$

PONTE-TUBO - RELAZIONE DI CALCOLO

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VERIFICHE STRUTTURALI DEL MICROPALO

Acciaio S 355 (Fe 510)

Tensioni nel singolo micropalo

$$\sigma = N/A_{arm} +/ - M/W_{arm}$$

$$\tau = 2 * T/A_{arm}$$

$$\sigma_{max} = 234,15 \quad (N/mm^2)$$

$$\sigma_{min} = -69,72 \quad (N/mm^2)$$

$$\tau = 14,14 \quad (N/mm^2)$$

$$\sigma_{id} = (\sigma^2 + 3 \tau^2)^{0,5}$$

$$\sigma_{id} = 235,43 \quad (N/mm^2)$$

verifica soddisfatta

CALCOLO DEL CEDIMENTO

OPERA: 433 - VER - SLU max

DATI DI IMPUT:

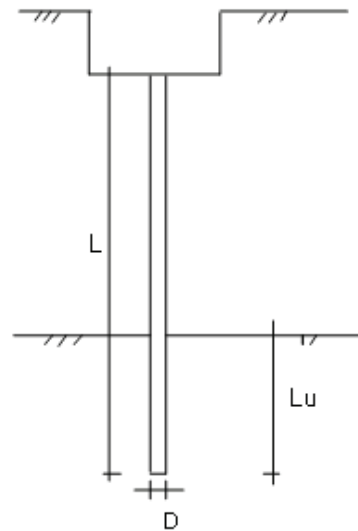
Diametro del Palo (D): 0,21 (m)

Carico massimo sul palo (Pmax): 335,00 (kN)

Lunghezza del Palo (L): 20,00 (m)

Lunghezza Utile del Palo (Lu): 17,00 (m)

Modulo di Deformazione (E): 10000 (kN/m²)



CEDIMENTO DEL MICROPALO SINGOLO:

$$\delta = \beta * P_{max} / E * Lu$$

Coefficiente di forma

$$\beta = 0,5 + \text{Log}(Lu_{tile} / D): 2,41 \quad (-)$$

Cedimento del palo

$$\delta = \beta * P_{max} / E * Lu \quad 4,75 \quad (mm)$$

Si riporta anche la verifica a tensione di sfilamento per i micropali in trazione con un cono di attrito a falde inclinate 1/10 ipotizzando la rottura a cono invertito :

$$D_i = 21 \text{ cm}$$

$$P = 1/10$$

$$L = 20.0 \text{ m}$$

$$D_e = D_i + 2 \times P \times L = 4.21 \text{ m}$$

$$N_{\text{vert_SLU_max}} = +226.50 \text{ kN}$$

$$\tau_{\text{lim}} = 0.20 \text{ daN/cm}^2$$

$$\tau_{\text{max}} = N_{\text{vert_SLU_max}} / [(21+421) / 2 \times \pi \times L] = 0.02 \text{ daN/cm}^2 < \tau_{\text{lim}} \quad \text{Verificato}$$

Le verifiche sono tutte soddisfatte.

15 Verifica micropalo – Azioni orizzontali

Di seguito si riportano le verifiche dei micropali in oggetto:

$$\varnothing_e = 139.7 \text{ mm}$$

$$S = 10 \text{ mm}$$

$$L = 20.00 \text{ m}$$

$$\varnothing_{\text{foro}} = 210.0 \text{ mm}$$

$$H_{\text{orizz_SLU_max}} = 28.77 \text{ kN}$$

Calcolo del momento di plasticizzazione di un micropalo

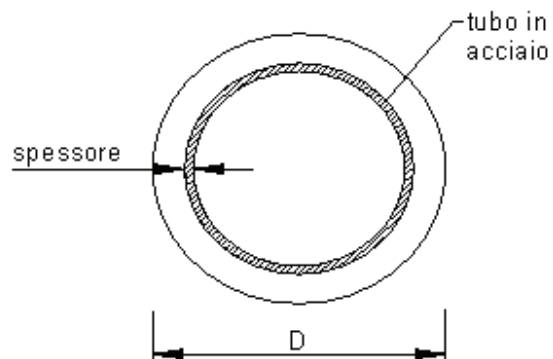
Diametro = 210 (mm)

Tubo

Diametro esterno = 139,7 (mm)

Spessore = 10,0 (mm)

Sforzo Normale = 335,4 (kN)



Caratteristiche dei Materiali

malta

$R_{ck} = 35$ (N/mm²)

$\gamma_{m,c} = 1,9$

$\alpha = 0,8$

$f_{cd} = R_{ck} / \gamma_c = 18,42$ (N/mm²)

Acciaio

tipo di acciaio

$f_{yk} = 355$ (N/mm²)

$\gamma_{E,d} = 1,05$

$\gamma_m = 1,15$

$f_{yd} = f_{yk} / \gamma_m / \gamma_{E,d} = 294,0$ (N/mm²)

$E_s = 210000$ (N/mm²)

$\epsilon_{yk} = 0,140\%$

$\epsilon_{uk} = 1,000\%$

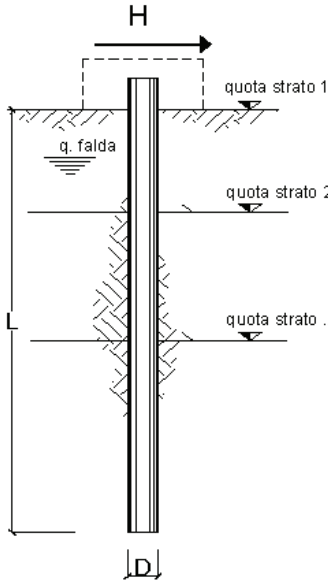
Momento di Plasticizzazione

$M_y = 54,9$ (kN m)

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA	LOTTO	ELABORATO	DOCUMENTO	REV.	FOGLIO
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opera **433 - SLU F orizz - Condizione a breve termine**



strati terreno	descrizione	quote (m)	γ (kN/m ³)	γ' (kN/m ³)	φ (°)	k_p	c_u (kPa)
p.c.=strato 1		100,00	19	21		1,00	67
<input checked="" type="checkbox"/> strato 2		91,50	19	21	35,9	3,84	
<input checked="" type="checkbox"/> strato 3		70,50	19	21	36,8	3,99	
<input checked="" type="checkbox"/> strato 4		64,50	19	21	36,8	3,99	
<input type="checkbox"/> strato 5						1,00	
<input type="checkbox"/> strato 6						1,00	

Quota falda 0 (m)

Diametro del palo D 0,21 (m)

Lunghezza del palo L 20,00 (m)

Momento di plasticizzazione palo M_y 54,9 (kNm)

Step di calcolo 0,01 (m)

palo impedito di ruotare
 palo libero

Palo lungo H = 132,3 (kN)
Palo intermedio H = 2074,7 (kN)
Palo corto H = 8560,3 (kN)

H_{lim} = 132,3 (kN) Palo lungo

$$H_{\text{orizz_SLU_max}} = 28.77 \text{ kN} < H_{\text{lim}} = 132.3 \text{ kN}$$

Verificato

Le verifiche sono tutte soddisfatte sulla base dei materiali adottati.

PONTE-TUBO - RELAZIONE DI CALCOLO

COMMESSA
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1. Tabulato completo PROSAP ponte-tubo

(I tabulati di calcolo completi sono disponibili su supporto informatico)