October 19, 2004 Matls. IM 452.02
Supersedes October 3, 2000

COMPUTING STRUCTURAL STEEL WEIGHT (MASS)

COMPUTED WEIGHT (MASS)

The engineer will compute the weight (mass) of structural steel on the basis of the following assumptions as to density - kilograms per cubic meter (pounds per cubic foot):

Steel	490 lb./ft.^{3}	(7850 kg/m^3)
Cast Iron	450 lb./ft.^{3}	(7210 kg/m^3)

The weight (mass) of rolled shapes and plates will be computed on the basis of their nominal weight (mass) and dimensions as shown in the contract documents, deducting for copes and cuts.

The weight (mass) of welds will be included in the computed weight (mass), assuming the weight (mass) of fillet welds to be used as follows:

WEIGHT OF WELDS*

Size of Weld in.	Wt. per Foot lb.	Size of Weld in.	Wt. per Foot lb.
1/4	0.16	1/2	0.64
5/16	0.25	5/8	1.00
3/8	0.36	3/4	1.44

MASS OF WELDS*

Size of Weld mm	Mass per Meter kg	Size of Weld mm	Mass per Meter kg
6	0.21	13	0.99
8	0.38	16	1.51
10	0.59	19	2.13

* The weight (mass) of welds shown is 1.5 times theoretical weight (mass).

The weight (mass) of heads, nuts, single washers, and threaded stick through of all high strength shop bolts shall be included in the computed weight (mass) on the basis of the following weight (mass):

Weight of ASTM A325 or A490 high strength bolts

Heavy hex structural bolts with heavy hex nuts in pounds per 100

Length Under Head Inches	Diameter of Bolt in Inches								
	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
1	16.5	29.4	47.0	...	...	...	...	...	...
1 1/4	17.8	31.1	49.6	74.4	104	...	...	...	...
1 1/2	19.2	33.1	52.2	78.0	109	148	197	...	...
1 3/4	20.5	35.3	55.3	81.9	114	154	205	261	333
2	21.9	37.4	58.4	86.1	119	160	212	270	344
2 1/4	23.3	39.8	61.6	90.3	124	167	220	279	355
2 1/2	24.7	41.7	64.7	94.6	130	174	229	290	366
2 3/4	26.1	43.9	67.8	98.8	135	181	237	300	379
3	27.4	46.1	70.9	103	141	188	246	310	391
3 1/4	28.8	48.2	74.0	107	146	195	255	321	403
3 1/2	30.2	50.4	77.1	111	151	202	263	332	416
3 3/4	31.6	52.5	80.2	116	157	209	272	342	428
4	33.0	54.7	83.3	120	162	216	280	353	441
4 1/4	34.3	56.9	86.4	124	168	223	289	363	453
4 1/2	35.7	59.0	89.5	128	173	230	298	374	465
4 3/4	37.1	61.2	92.7	133	179	237	306	384	478
5	38.5	63.3	95.8	137	184	244	315	395	490
5 1/4	39.9	65.5	98.9	141	190	251	324	405	503
5 1/2	41.2	67.7	102	146	196	258	332	416	515
5 3/4	42.6	69.8	105	150	201	265	341	426	527
6	44.0	71.9	108	154	207	272	349	437	540
6 1/4	...	74.1	111	158	212	279	358	447	552
6 1/2	...	76.3	114	163	218	286	367	458	565
6 3/4	...	78.5	118	167	223	293	375	468	577
7	...	80.6	121	171	229	300	384	479	589
7 1/4	...	82.8	124	175	234	307	392	489	602
7 1/2	...	84.9	127	179	240	314	401	500	614
7 3/4	...	87.1	130	183	246	321	410	510	626
8	...	89.2	133	187	251	328	418	521	639
8 1/4	...	...	...	192	257	335	427	531	651
8 1/2	...	...	...	196	262	342	435	542	664
8 3/4	...	...	...	...	...	...	444	552	676
9	...	...	...	...	...	...	453	563	689
Per inch additional add	5.5	8.6	12.4	16.9	22.1	28.0	34.4	42.5	49.7
For each 100 plain round washers add	2.1	3.6	4.8	7.0	9.4	11.3	13.8	16.8	20.0
For each 100 beveled square washers add	23.1	22.4	21.0	20.2	19.2	34.0	31.6	...	...

This table conforms to weight standards adopted by the Industrial Fasteners Institute.