DAMPO

Dampo 1505 is a hysteretic type seismic energy dissipator developed and patented in Mexico. The device takes advantage of the hysteretic behavior of steel by means of plastic rotations and its innovative design allows for any combination of required strength and displacement. The dissipator includes an outer shell that protects the device and a connection preparation with a round HSS section. The profile designation will be as required for the connecting brace (not included).

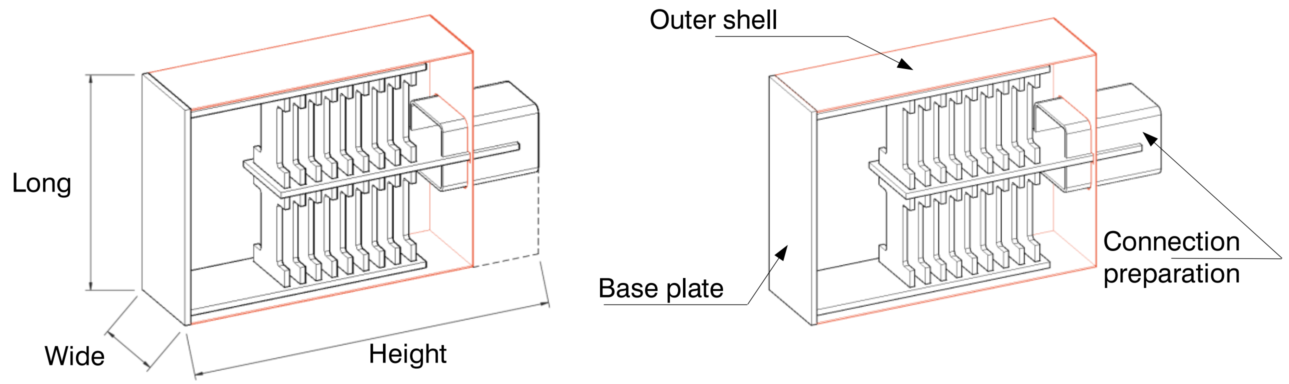

Figure 1. General features of DAMPO 1505 dissipator

Thanks to its design, the Dampo 1505 dissipator exhibits stable non-linear behavior in both tension and compression, as shown in Figure 2a. This performance makes it ideal for incorporation into earthquake-resistant structures. The devices are installed collinearly with the connecting brace as shown in Figure 2b.

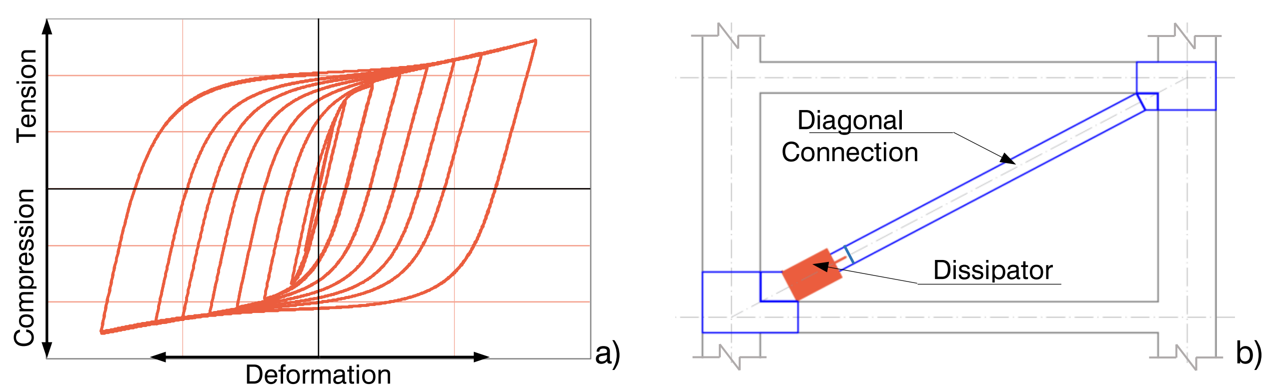

Figure 2. Hysteresis curve and placement sketch of DAMPO 1505 dissipator

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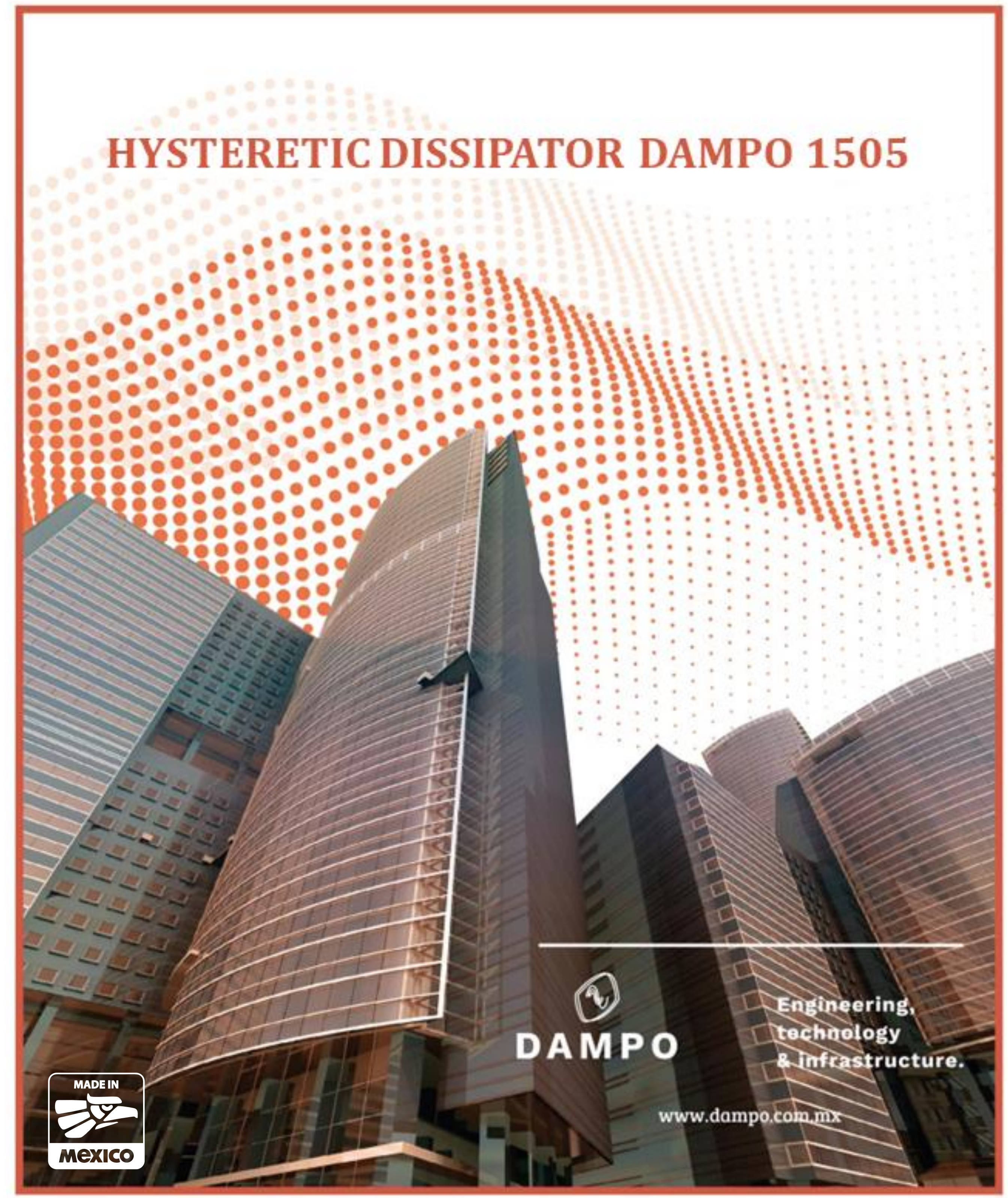

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Dampo 1505 dissipators can be modeled in commercial programs as an equivalent element with non-linear behavior, usually defined as a "link". The parameters required to model the behavior of the disippator are stiffness (k_d) and design strength (F_d). It is also important to check the stiffness and strength of the connecting brace (CB). Table 1 shows the properties of the dissipator.

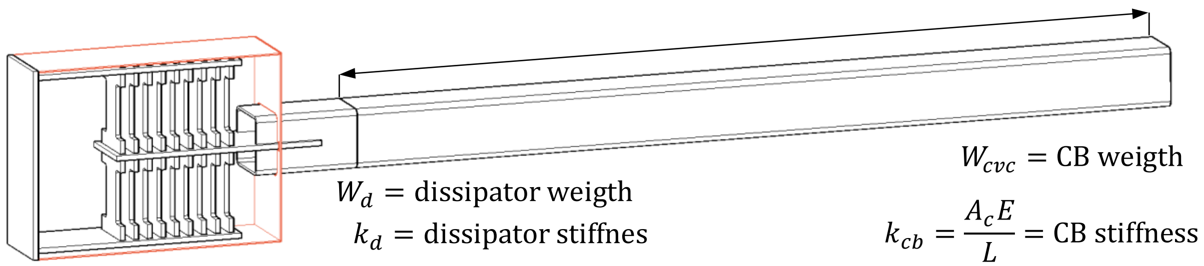

Figure 3. Variables for modeling

Table 2 shows the parameters for non-linear modeling of the device in commercial programs. It is recommended to use the "Plastic Wen" model. The values of k_d, W_d y F_d can be obtained from Table 1 according to the needs of your project. The value of k_{cb} corresponds to the axial stiffness of the connecting brace which is calculated with the equation in Figure 3.

Table 2. Parameters for defining the equivalent element (link) in structural analysis software

"*link*" Type	Mass	Weight	Rotacional inertia	Axial deformation
Plastic Wen	$M_t = W_t/g$	$W_t = W_d + W_c$	$R_1 = R_2 = R_3 = 0$	Direction $= U_1$
Effective stiffness	**Damping**	**Expected yield load**	**Post-yield stiffness ratio**	**Yield exponent**
$k_t = \frac{1}{\frac{1}{k_d}+\frac{1}{k_{cb}}}$	$= 0$	$F_d * 1.3$	0.05	1.2

Table 1. Properties of Dampo 1505 dissipators

	Design strength	Expected yield load	Expected max. load	Yield displ.	Max. displ.	Ductility	Axial stiffness	Dissipator features			
Model	F_d (t)	F_{fe} (t)	F_{max} (t)	d_y (mm)	d_{max} (mm)	$\mu = \frac{d_{max}}{d_y}$	k_d (kg/mm)	Long (cm)	Wide (cm)	Height (cm)	W_d (kg)
30/1	30	39	52.8	1.7	10	6	22140	35	20	79	57
30/2	30	39	52.8	3.3	20	6	11070	47	25	90	87
30/3	30	39	52.8	5.0	30	6	7380	55	30	99	118
30/4	30	39	52.8	6.7	40	6	5540	63	30	106	144
30/5	30	39	52.8	8.3	50	6	4430	63	35	109	187
30/6	30	39	52.8	10.0	60	6	3690	68	35	119	211
30/7	30	39	52.8	11.7	70	6	3160	64	40	133	274
30/8	30	39	52.8	13.3	80	6	2770	68	40	142	299
40/1	40	52	70.4	1.7	10	6	29520	39	20	73	81
40/2	40	52	70.4	3.3	20	6	14760	51	25	96	126
40/3	40	52	70.4	5.0	30	6	9840	61	30	105	167
40/4	40	52	70.4	6.7	40	6	7380	69	30	113	203
40/5	40	52	70.4	8.3	50	6	5900	76	35	120	244
40/6	40	52	70.4	10.0	60	6	4920	76	45	118	310
40/7	40	52	70.4	11.7	70	6	4220	74	45	129	369
40/8	40	52	70.4	13.3	80	6	3690	78	40	139	396
50/1	50	65	88.0	1.7	10	6	36900	39	25	83	97
50/2	50	65	88.0	3.3	20	6	18450	51	30	96	151
50/3	50	65	88.0	5.0	30	6	12300	61	35	105	202
50/4	50	65	88.0	6.7	40	6	9230	69	35	113	244
50/5	50	65	88.0	8.3	50	6	7380	76	40	120	295
50/6	50	65	88.0	10.0	60	6	6150	82	40	126	337
50/7	50	65	88.0	11.7	70	6	5270	81	45	129	406
50/8	50	65	88.0	13.3	80	6	4610	86	45	139	440

	Design strength	Expected yield load	Expected max. load	Yield displ.	Maximum displ.	Ductility	Axial stiffness	Dissipator features			
Modelo	F_d (t)	F_{fe} (t)	F_{max} (t)	d_y (mm)	d_{max} (mm)	$\mu = \frac{d_{max}}{d_y}$	k_d (kg/mm)	Largo (cm)	Ancho (cm)	Alto (cm)	W_d (kg)
60/1	60	78	105.6	1.7	10	6	44280	41	25	88	113
60/2	60	78	105.6	3.3	20	6	22140	55	30	101	177
60/3	60	78	105.6	5.0	30	6	14760	65	30	111	231
60/4	60	78	105.6	6.7	40	6	11070	74	35	119	290
60/5	60	78	105.6	8.3	50	6	8860	82	35	127	341
60/6	60	78	105.6	10.0	60	6	7380	83	45	126	428
60/7	60	78	105.6	11.7	70	6	6330	89	45	138	473
60/8	60	78	105.6	13.3	80	6	5530	87	45	145	549
70/1	70	91	123.2	1.7	10	6	51660	42	25	88	136
70/2	70	91	123.2	3.3	20	6	25830	58	25	106	198
70/3	70	91	123.2	5.0	30	6	17220	69	30	117	267
70/4	70	91	123.2	6.7	40	6	12910	79	35	126	334
70/5	70	91	123.2	8.3	50	6	10330	87	35	134	393
70/6	70	91	123.2	10.0	60	6	8610	94	40	141	460
70/7	70	91	123.2	11.7	70	6	7380	101	40	147	516
70/8	70	91	123.2	13.3	80	6	6460	108	40	154	572
80/1	80	104	140.8	1.7	10	6	59040	44	25	92	142
80/2	80	104	140.8	3.3	20	6	29520	58	30	106	224
80/3	80	104	140.8	5.0	30	6	19680	69	35	117	302
80/4	80	104	140.8	6.7	40	6	14760	79	35	126	370
80/5	80	104	140.8	8.3	50	6	11810	87	40	134	444
80/6	80	104	140.8	10.0	60	6	9840	94	40	141	510
80/7	80	104	140.8	11.7	70	6	8430	101	45	147	583
80/8	80	104	140.8	13.3	80	6	7380	108	45	154	647

Note: Table 1 presents the characteristics of typical Dampo 1505 dissipators; however, it is possible to increase the design strength of the dissipators and adjust the characteristics according to the needs of your project.