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Steven Waal

We found a discrepancy between ISO 13992 and 11088.

ISO 13992 - Alpine Touring ski-bindings - Requirements and test methods
This is what is used by TUV to certify the release characteristics of an alpine touring binding. Of note right now is Table 2 which defines the release torque and BSL associated with a given Z value. Note the Z scale only goes up to 10.

Table 2 — Setting scale

Setting mark Z	Release torques		Sole length l mm
	M_z Nm	M_y Nm	
0,5	5	18	200
1	10	37	225
1,5	15	55	243
2	20	75	258
2,5	25	94	270
3	30	114	280
3,5	35	134	290
4	40	154	298
4,5	45	175	306
5	50	196	314
5,5	55	218	320
6	60	239	327
6,5	65	261	333
7	70	284	339

Table 2 *(continued)*

Setting mark Z	Release torques		Sole length l mm
	M_z Nm	M_y Nm	
7,5	75	307	344
8	80	330	350
8,5	85	353	355
9	90	377	360
9,5	95	401	364
10	100	425	369

ISO 11088 - Alpine ski/binding/boot (S-B-B) system - Assembly, adjustment and inspection
This is what is used by ski shops to map a given skier (height & weight) to a desired maximum release torque for Mz and My, and subsequently map that to a Z value based on their given BSL. This is summarized in Table B1. Note that in this table the Z scale goes up to 12.

Table B.1 — Release value selection using skier's mass

Mandatory release values					Examples for initial indicator position							
Skier's parameters			Inspection parameters		These are only the starting points in the binding setting process and can be modified to bring the measured release values into the inspection range. Z (pre-setting) depending on boot sole length							
Skier's mass kg	Skier's height m	Skier code	Twist M_Z Nm	Forward-lean M_Y Nm	≤230 mm mm	231 mm to 250 mm mm	251 mm to 270 mm mm	271 mm to 290 mm mm	291 mm to 310 mm mm	311 mm to 330 mm mm	331 mm to 350 mm mm	≥ 351 mm mm
—	—	—	5[a]	18[a]	—	—	—	—	—	—	—	—
10 to 13	—	A	8	29	0,75	0,75	0,75	—	—	—	—	—
14 to 17	—	B	11	40	1,00	0,75	0,75	0,75	—	—	—	—
18 to 21	—	C	14	52	1,50	1,25	1,25	1,0	—	—	—	—
22 to 25	—	D	17	64	2,00	1,75	1,50	1,5	1,25	—	—	—
26 to 30	—	E	20	75	2,50	2,25	2,00	1,75	1,50	1,50	—	—
31 to 35	—	F	23	87	3,00	2,75	2,50	2,25	2,00	1,75	1,75	—
36 to 41	—	G	27	102	—	3,50	3,00	2,75	2,50	2,25	2,00	—
42 to 48	≤1,48	H	31	120	—	—	3,50	3,0	3,00	2,75	2,50	—
49 to 57	1,49 to 1,57	I	37	141	—	—	4,50	4,0	3,50	3,50	3,0	—
58 to 66	1,58 to 1,66	J	43	165	—	—	5,50	5,0	4,50	4,00	3,50	3,00
67 to 78	1,67 to 1,78	K	50	194	—	—	6,50	6,0	5,50	5,00	4,50	4,00
79 to 94	1,79 to 1,94	L	58	229	—	—	7,50	7,0	6,50	6,00	5,50	5,00
≥95	≥1,95	M	67	271	—	—	—	8,50	8,00	7,00	6,50	6,00
—	—	N	78	320	—	—	—	10,00	9,50	8,50	8,00	7,50
—	—	O	91	380	—	—	—	11,50	11,00	10,00	9,50	9,00
—	—	—	105	452	—	—	—	—	—	12,00	11,00	10,50
—	—	—	121	520	—	—	—	—	—	—	—	—
—	—	—	137[b]	588[b]	—	—	—	—	—	—	—	—

NOTE 1 For skiers of 13 kg and under, no further correction is appropriate.

NOTE 2 For skiers of 17 kg and under, skier type −1 (see A.2.1) is inappropriate.

[a] Lowermost tolerance limit.

[b] Uppermost tolerance limit.

Comparison

Note that ISO 13992 Table 2 and ISO 11088 Table B1 each define a relationship between Z setting, Maximum torque in Mz or My, and BSL.

I have two goals:

1. “Extend” ISO 13992 Table 2 so that it can account for Z values above 10.
2. Find a way to determine the maximum release torque (in Mz and My) for *any* BSL associated with a given Z value.

Goal 1: “Extend” ISO 13992 Table 2 so that it can account for Z values above 10

I extended ISO 13992 Table 2 by creating the following curve fits:

- Mz as a function of z
- My as a function of z
- BSL as a function of z

The details of this curve fitting can be found here: [Jira Ticket SON-80]

Goal 2: Find a way to determine the maximum release torque (in Mz and My) for *any* BSL associated with a given Z value

I decided to “normalize” the maximum torque values into a force by dividing by the BSL in ISO 13992 Table 2. I can then multiply this “normalized” force by any BSL to determine the maximum torque that could be expected by that boot at that given Z setting. Consider the following example:

ISO 13992 Table 2				Normalized Values		Calculated Values		
Z setting [-]	Mz [Nm]	My [Nm]	BSL [mm]	Mz/BSL [N]	My/BSL [N]	Desired BSL [mm]	Mz [Nm]	My [Nm]
8	80	330	350	228.6	942.9	323	73.8	304.6

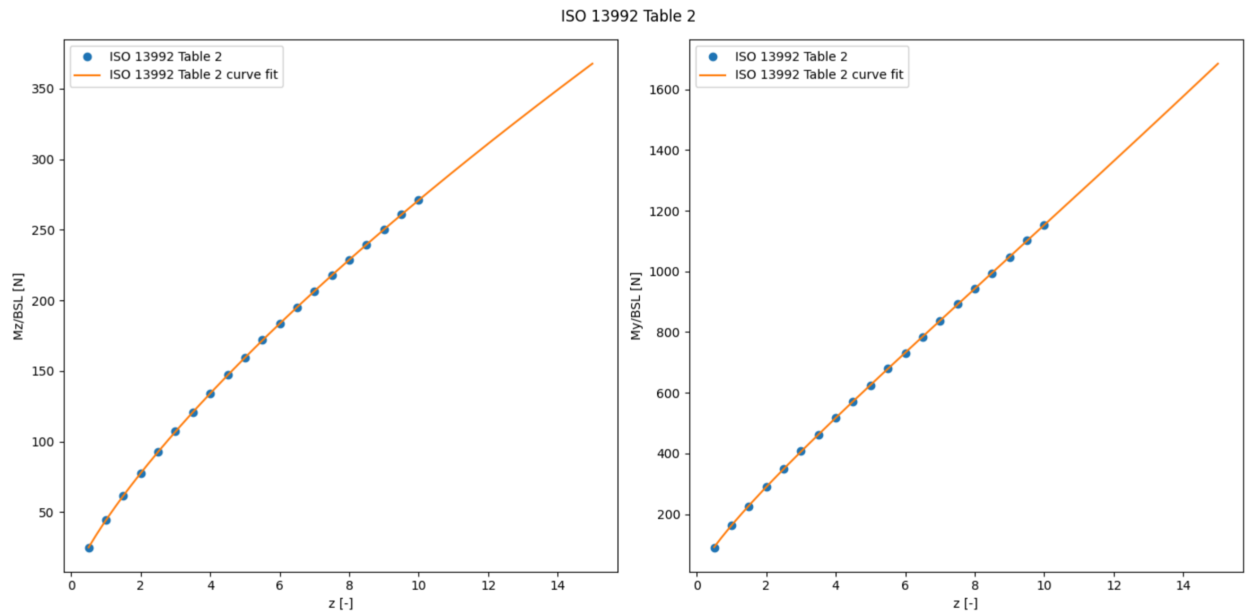
Working with the “normalized” force values (Mz/BSL) and (My/BSL) is advantageous because it allows for a direct comparison between tests done with different boots. If I test with Jesse’s boot (BSL 313mm) and then do a different test with my boot (BSL 323mm), I can plot the release curves on the same plot when I normalize the torque on the boot by dividing by the corresponding BSL.

Using the curve fitting techniques described above, a complete extended version of ISO 13992 Table 2 can be created.

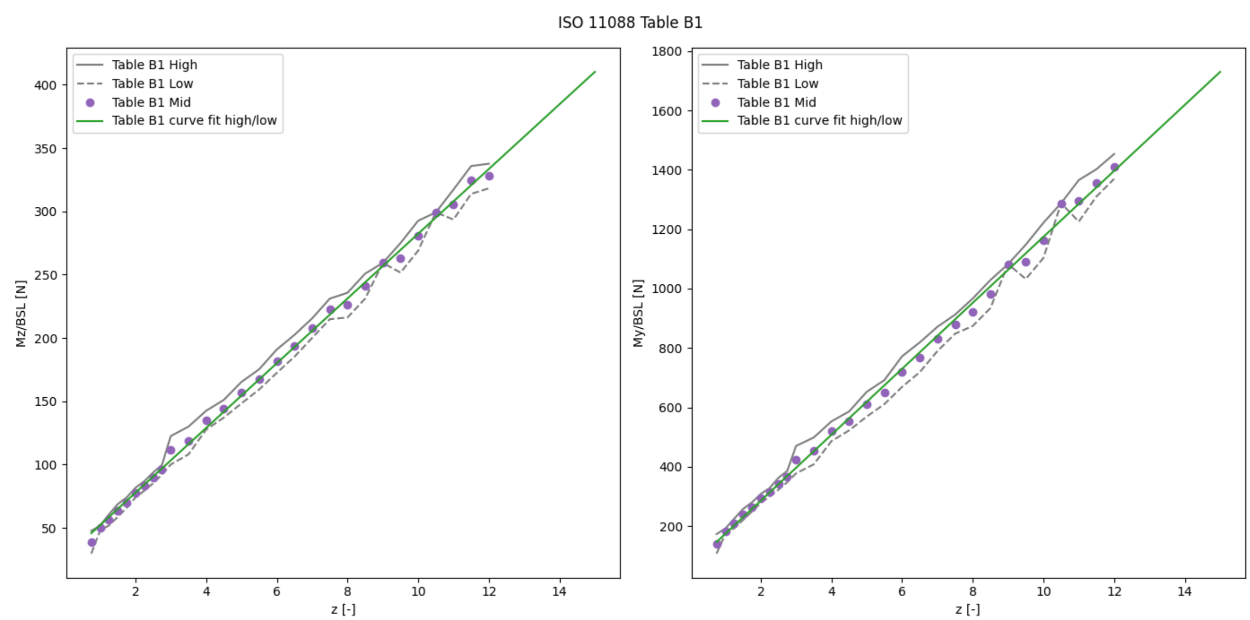
ISO 13992 Table 2

Z [-]	Mz [Nm]	My [Nm]	BSL [mm]	Mz/BSL [N]	My/BSL [N]
0.5	5.0	18.0	200	25.0	90.0
1.0	10.0	37.0	225	44.4	164.4
1.5	15.0	55.0	243	61.7	226.3
2.0	20.0	75.0	258	77.5	290.7
2.5	25.0	94.0	270	92.6	348.1
3.0	30.0	114.0	280	107.1	407.1
3.5	35.0	134.0	290	120.7	462.1
4.0	40.0	154.0	298	134.2	516.8
4.5	45.0	175.0	306	147.1	571.9
5.0	50.0	196.0	314	159.2	624.2
5.5	55.0	218.0	320	171.9	681.2
6.0	60.0	239.0	327	183.5	730.9
6.5	65.0	261.0	333	195.2	783.8
7.0	70.0	284.0	339	206.5	837.8
7.5	75.0	307.0	344	218.0	892.4
8.0	80.0	330.0	350	228.6	942.9
8.5	85.0	353.0	355	239.4	994.4
9.0	90.0	377.0	360	250.0	1047.2
9.5	95.0	401.0	364	261.0	1101.6
10.0	100.0	425.0	369	271.0	1151.8
------- interpolated from above ----------					
10.5	105.0	450.0	373	281.2	1205.2
11.0	110.0	475.1	378	291.3	1258.0
11.5	115.0	500.5	382	301.2	1310.8
12.0	120.0	526.2	386	311.0	1363.7
12.5	125.0	552.2	390	320.7	1416.9
13.0	130.0	578.6	394	330.3	1470.1
13.5	135.0	605.3	397	339.8	1523.6
14.0	140.0	632.4	401	349.2	1577.2
14.5	145.0	659.7	404	358.5	1631.1
15.0	150.0	687.4	408	367.7	1685.1

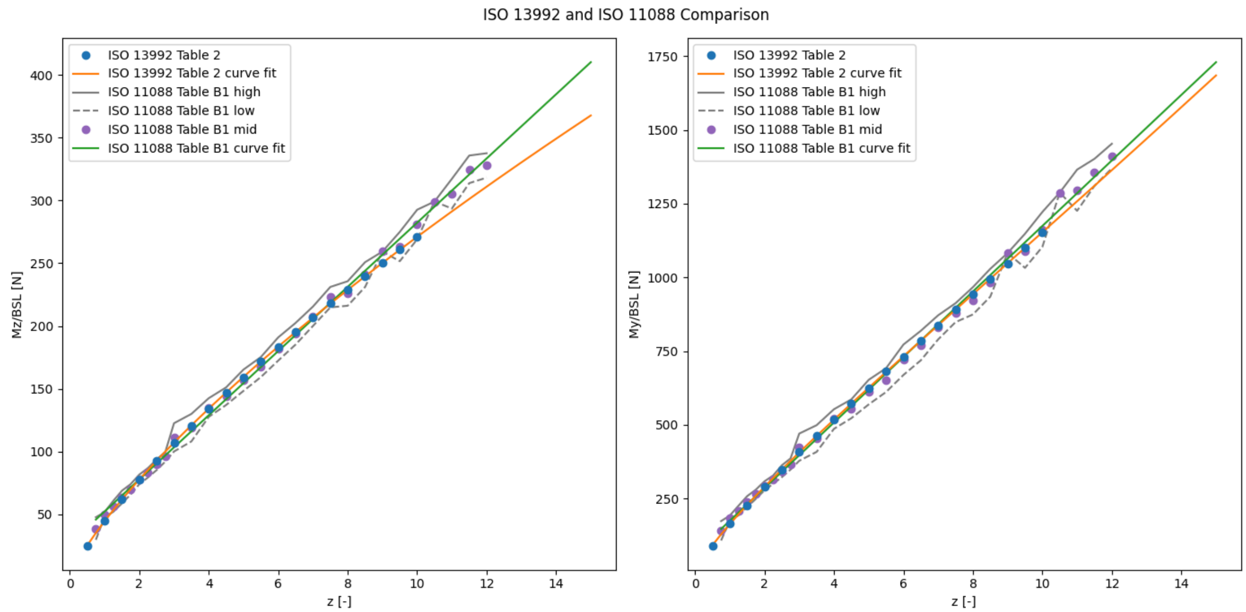
The plots below help visualize the data and the curve fits.



Similarly, Mz/BSL and My/BSL can be calculated from the values given in ISO 11088 Table B1. Note, however, that there are multiple valid values of Mz/BSL and My/BSL for most Z values since most of the Z values are duplicated in the table. Therefore, a range can be found by calculating all possible Mz/BSL and My/BSL values associated with a given Z value and then taking the min and max. A median value can then also be found. Applying a curve fit then allows the calculation of Mz/BSL and My/BSL for Z values greater than 10. The plots below illustrate the results.



Overlaying the two plots allows us to directly compare the computed values.



As can be seen, ISO 13992 and ISO 11088 don’t prescribe the same release values. This is most noticeable for Z values above ~10 in the Mz release direction.

So the real question… what is the correct way to extend and interpret ISO 13992 Table 2? To my knowledge, there is no ISO standard that describes how to do this, and yet I know there is some sort of agreed upon method since it was done in ISO 11088 Table B1. The kicker is the way it was done doesn’t seem intuitive, because the values diverge as shown above.