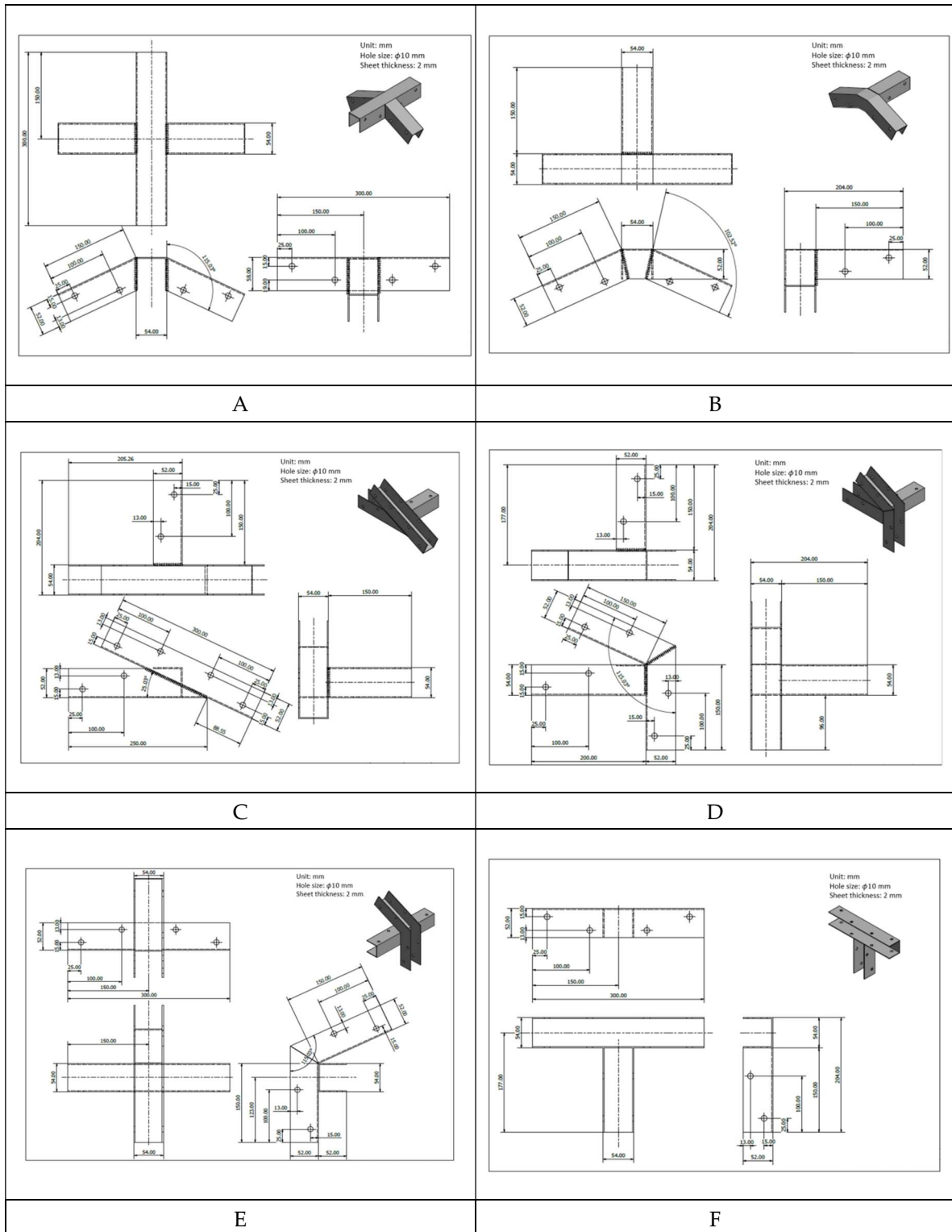
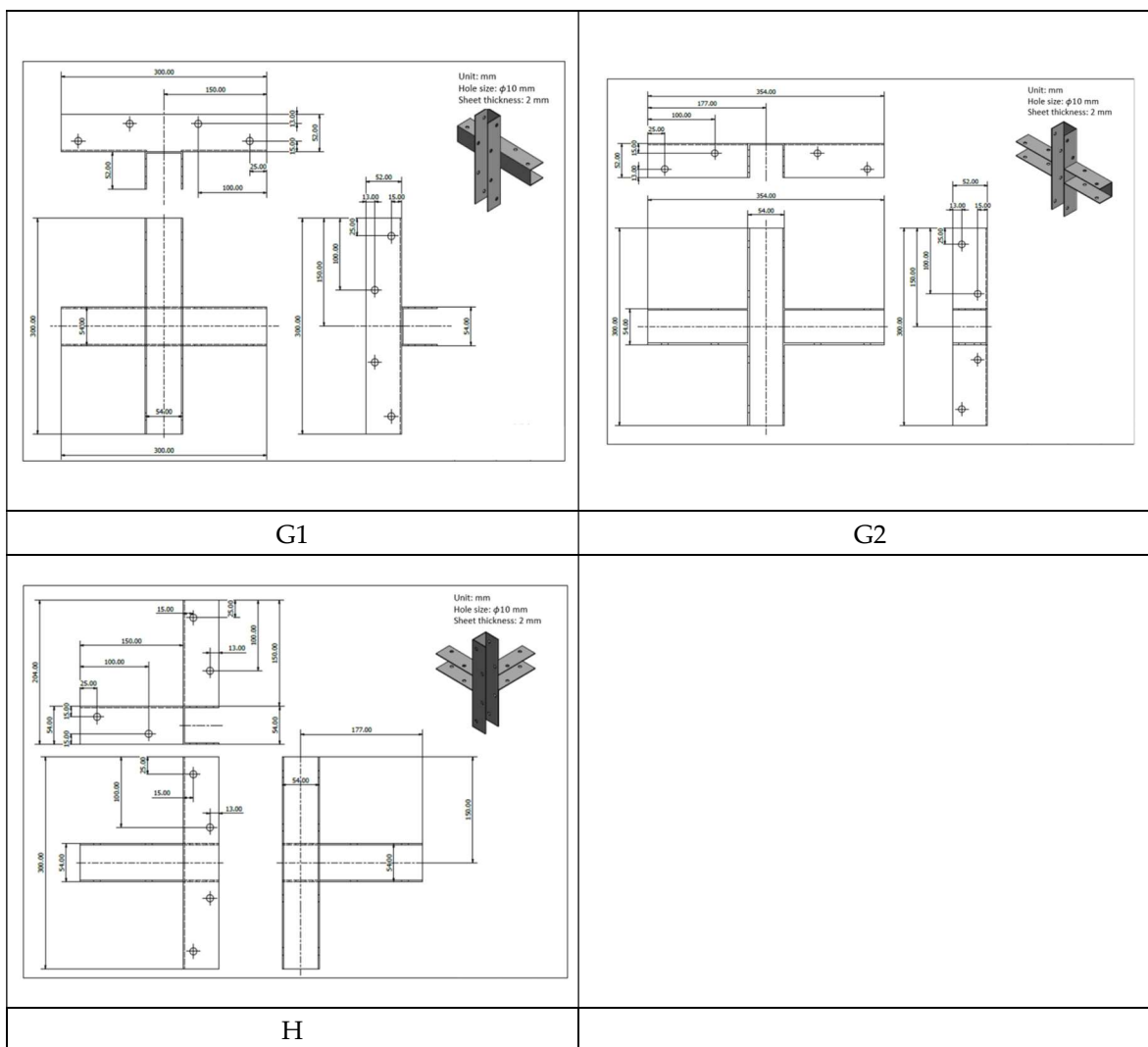
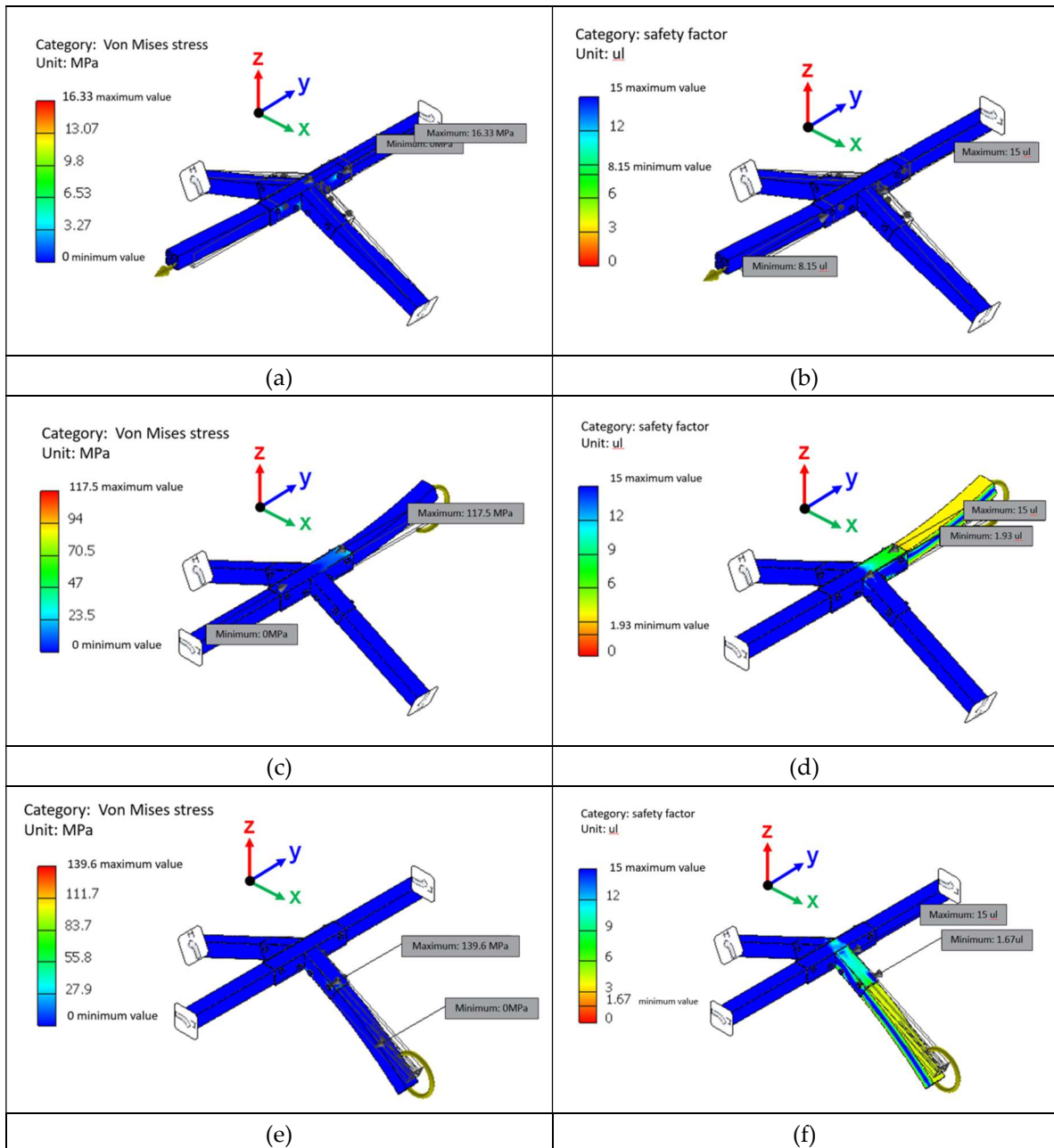


## Supplementary

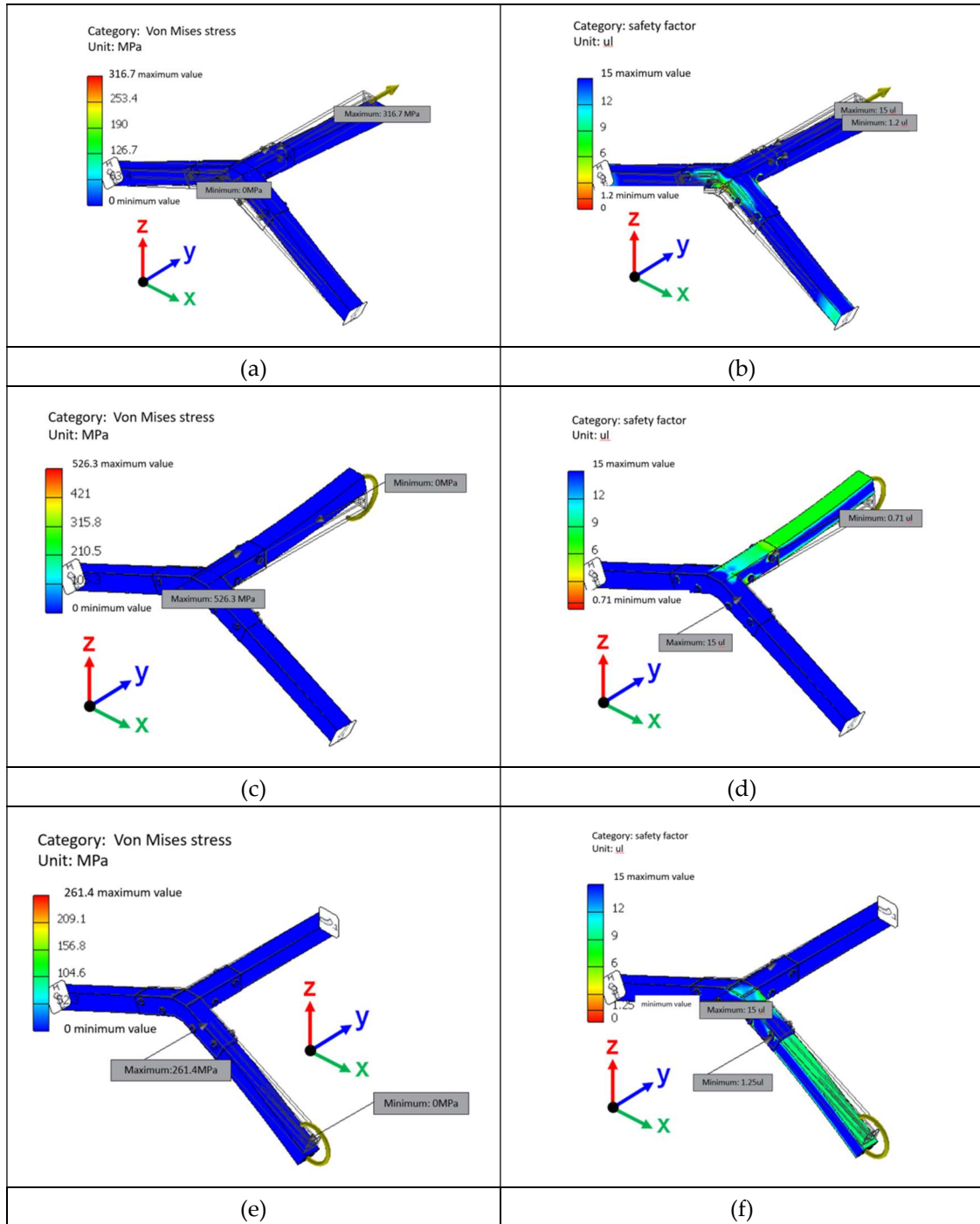




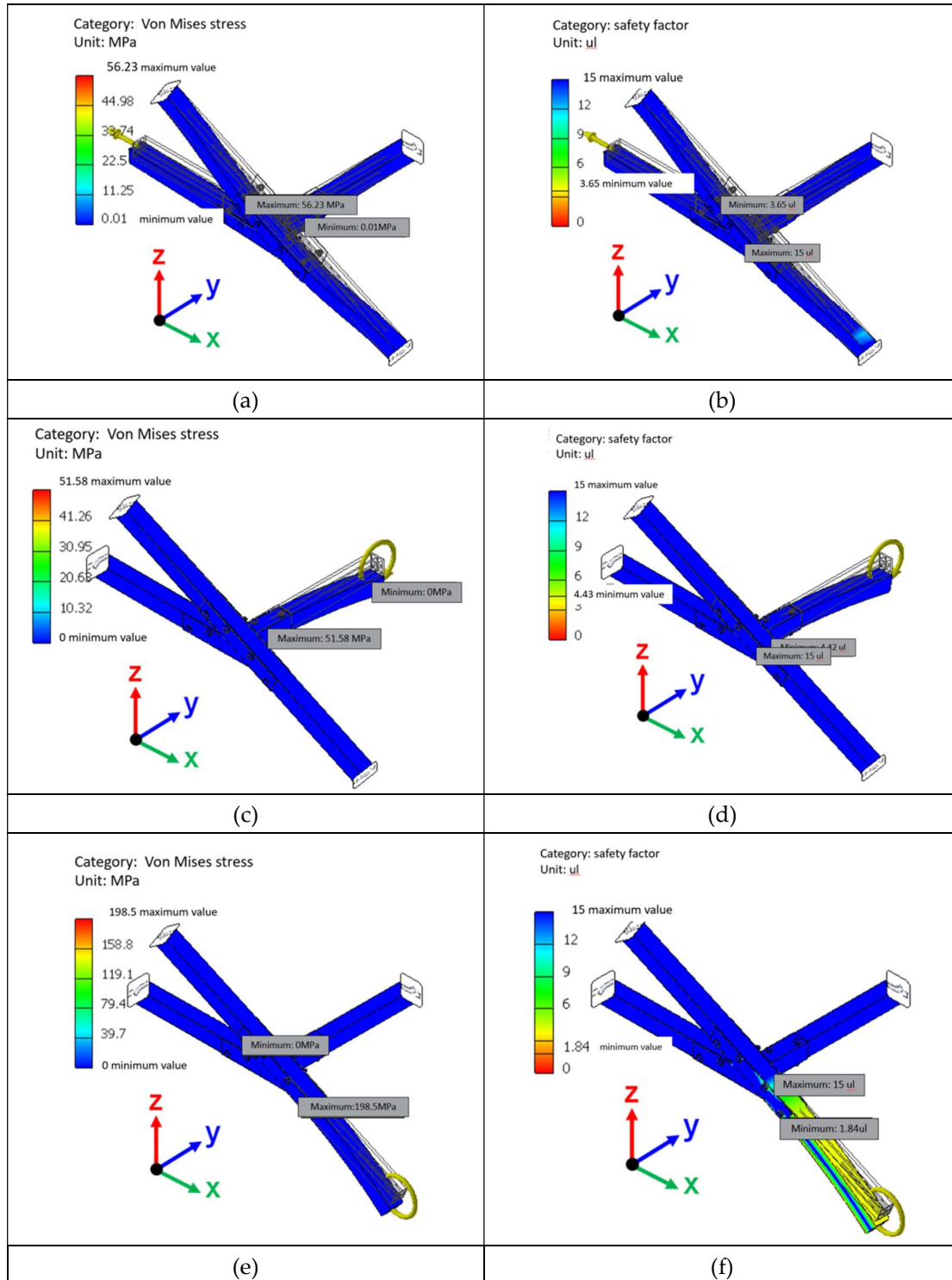
**Figure S1.** The dimension information of fastener A to I.



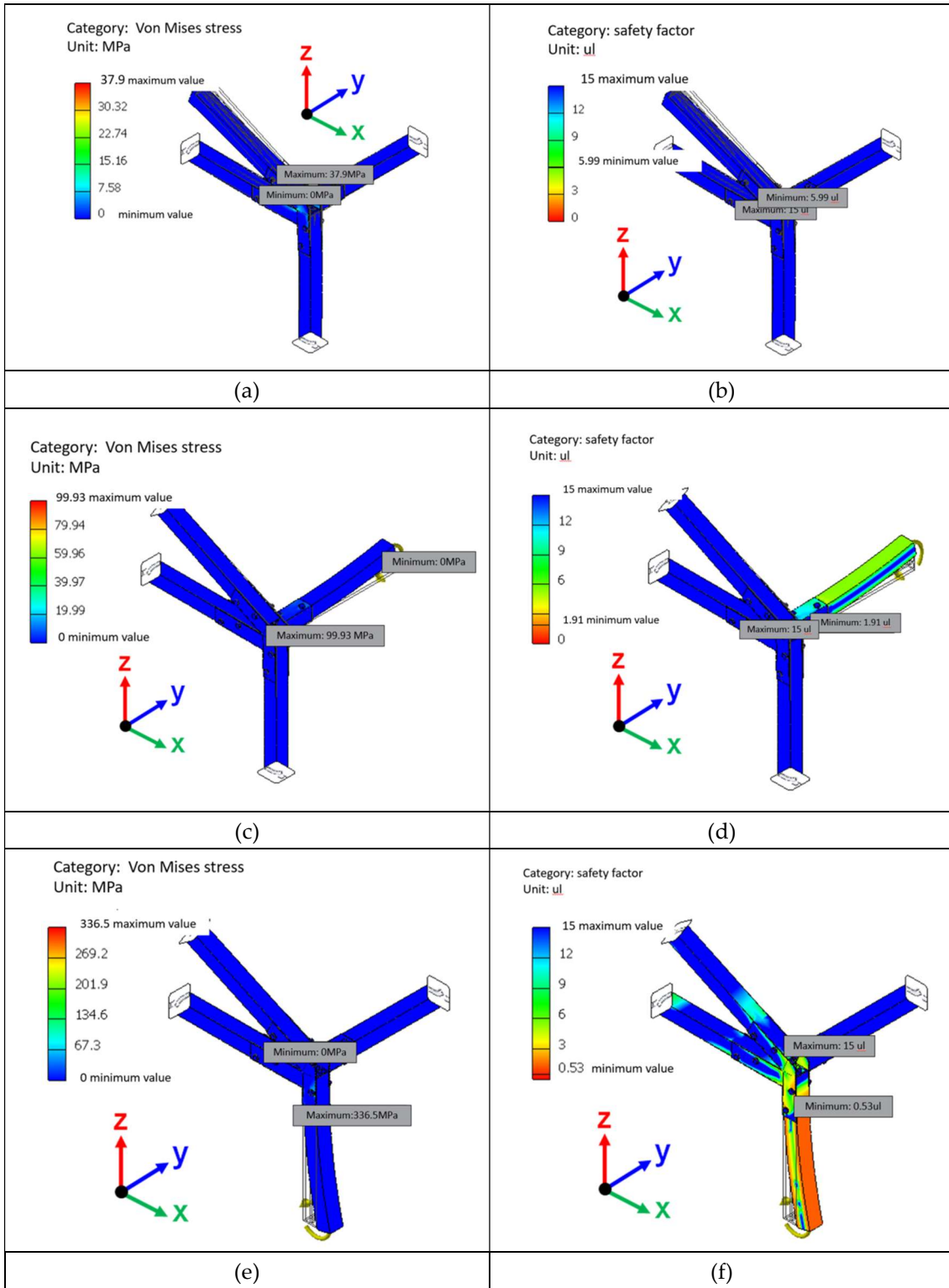
**Figure S2.** Fastener A (a) von Mises stress and (b) safety factor under axial tension (c) von Mises stress and (d) safety factor under X-axis bending moment (e) von Mises stress and (f) safety factor under Y-axis bending moment



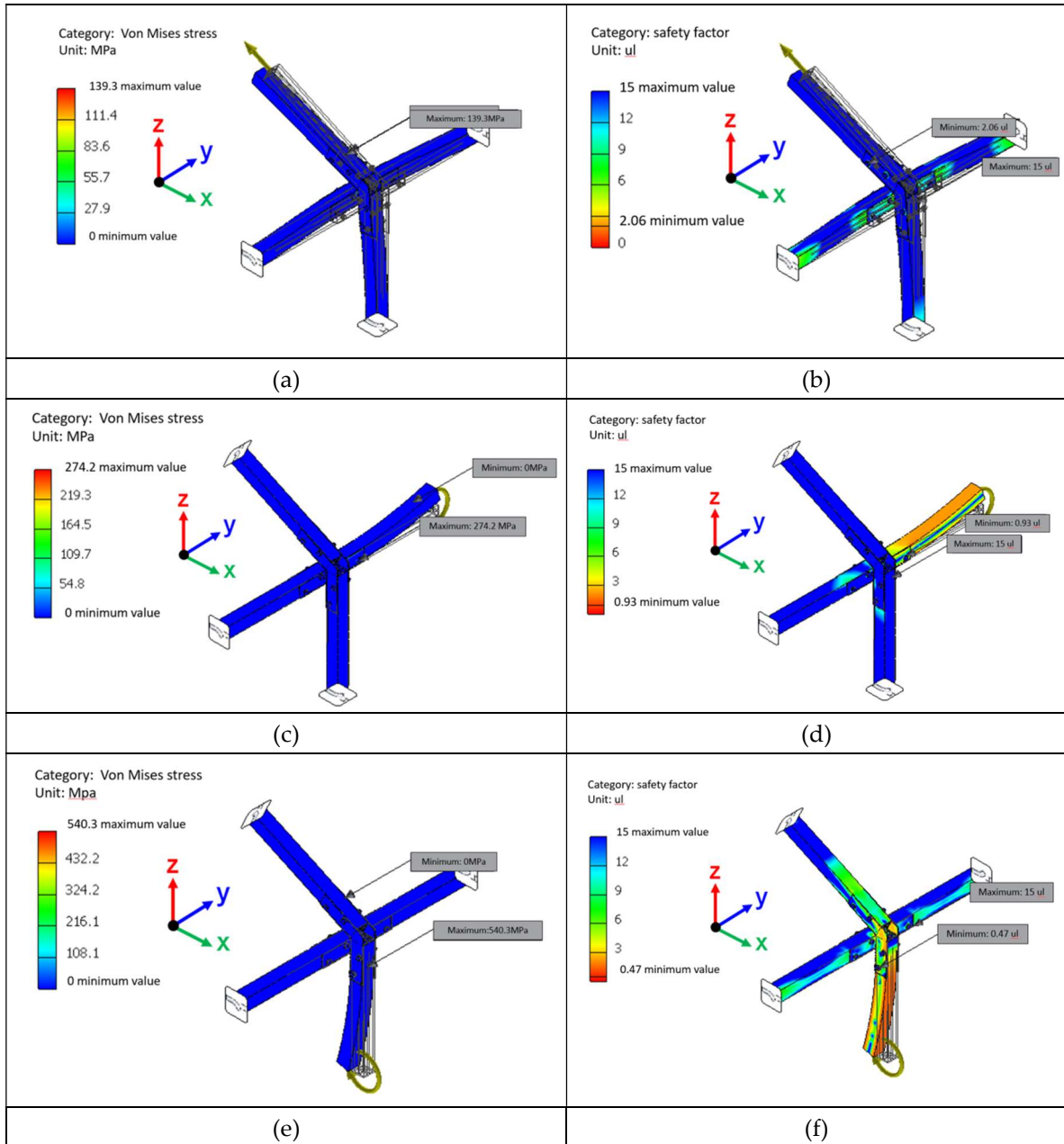
**Figure S3.** Fastener B (a) von Mises stress and (b) safety factor under axial tension (c) von Mises stress and (d) safety factor under X-axis bending moent (e) von Mises stress and (f) safety factor under Y-axis bending moment



**Figure S4.** Fastener C (a) von Mises stress and (b) safety factor under axial tension (c) von Mises stress and (d) safety factor under X-axis bending moment (e) von Mises stress and (f) safety factor under Y-axis bending moment

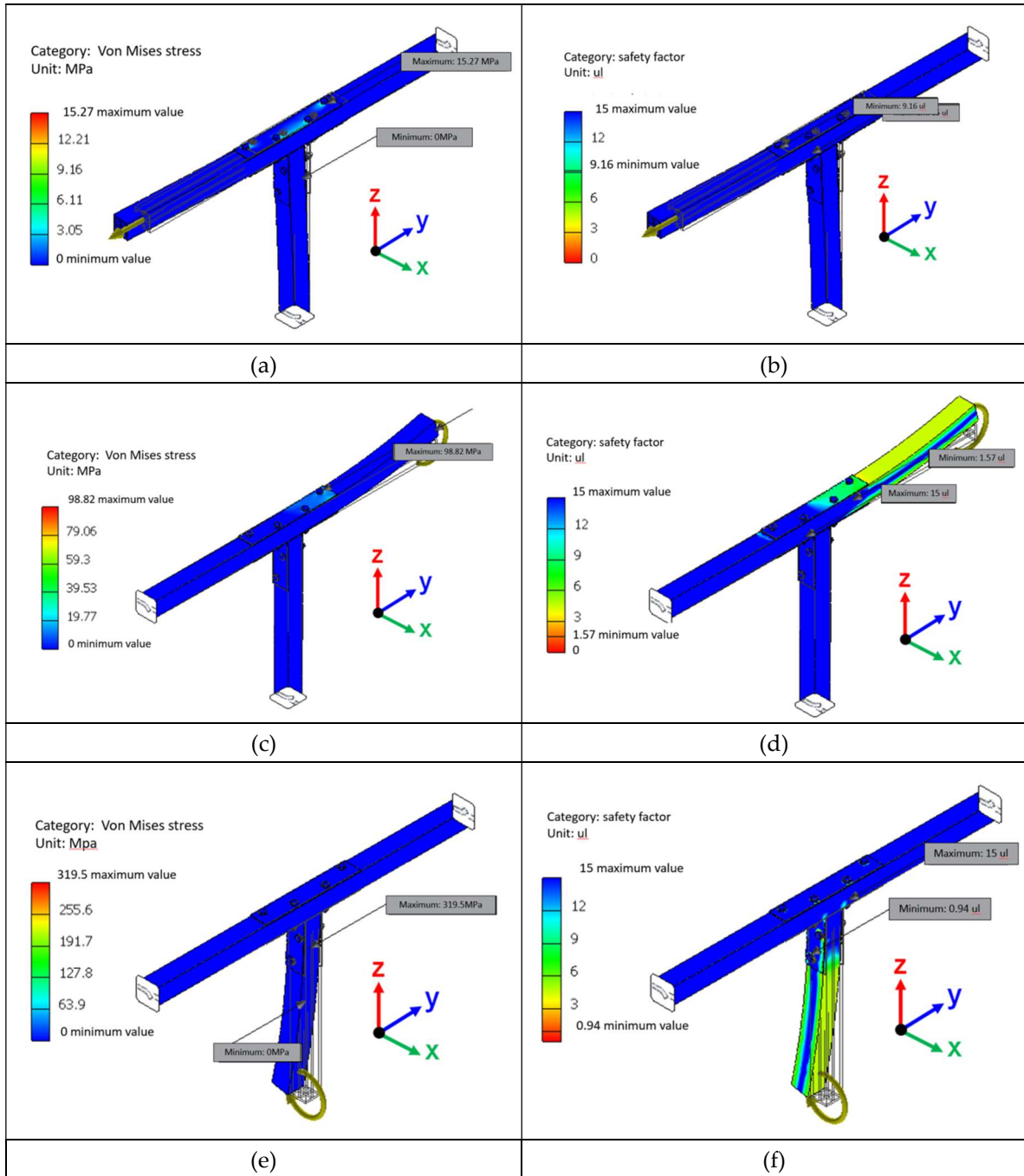


**Figure S5.** Fastener D (a) von Mises stress and (b) safety factor under axial tension (c) von Mises stress and (d) safety factor under X-axis bending moment (e) von Mises stress and (f) safety factor under Y-axis bending moment



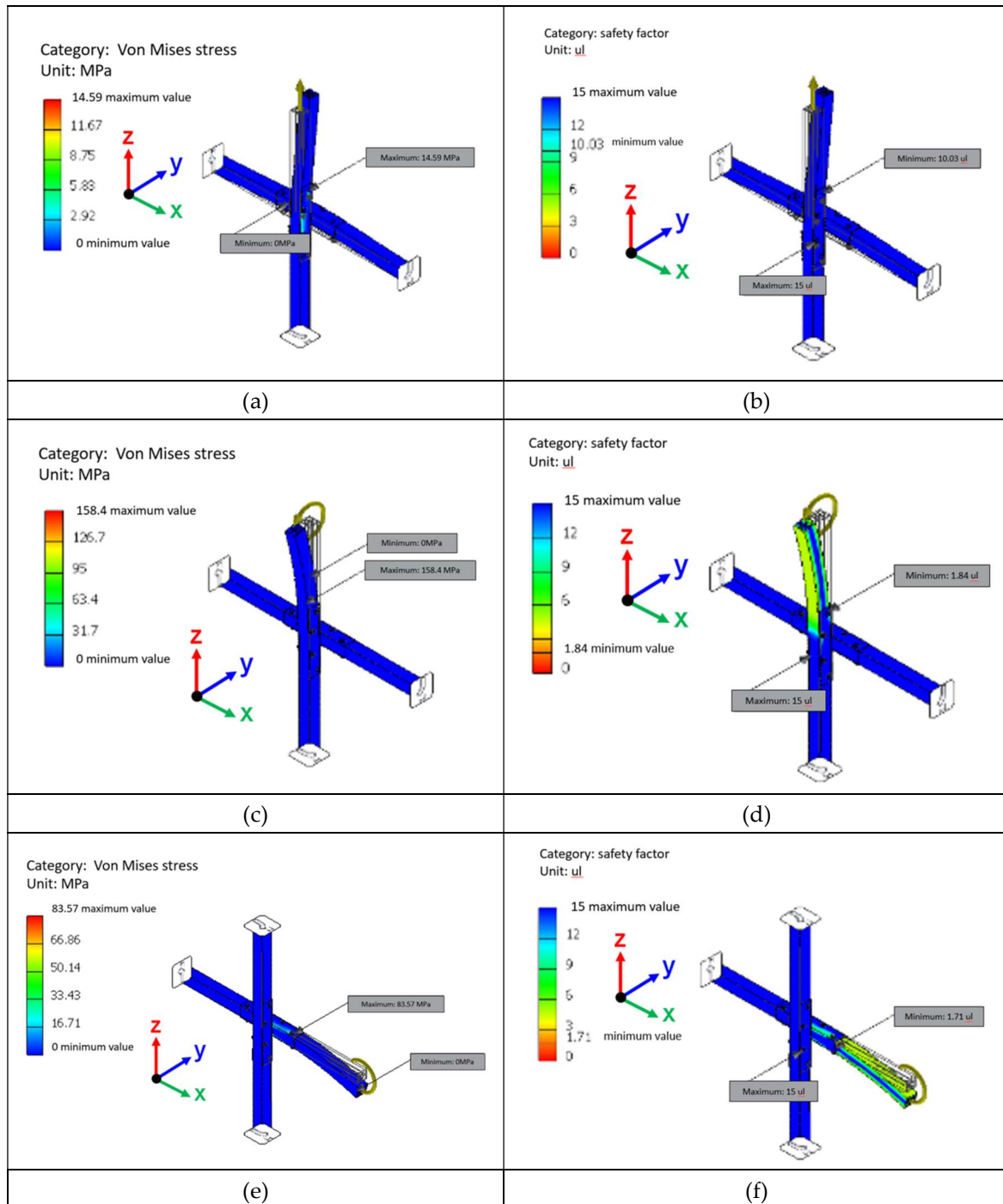
**Figure S6.** Fastener E (a) von Mises stress and (b) safety factor under axial tension (c) von Mises stress and (d) safety factor under X-axis bending moment (e) von Mises stress and (f) safety factor under Y-axis bending moment



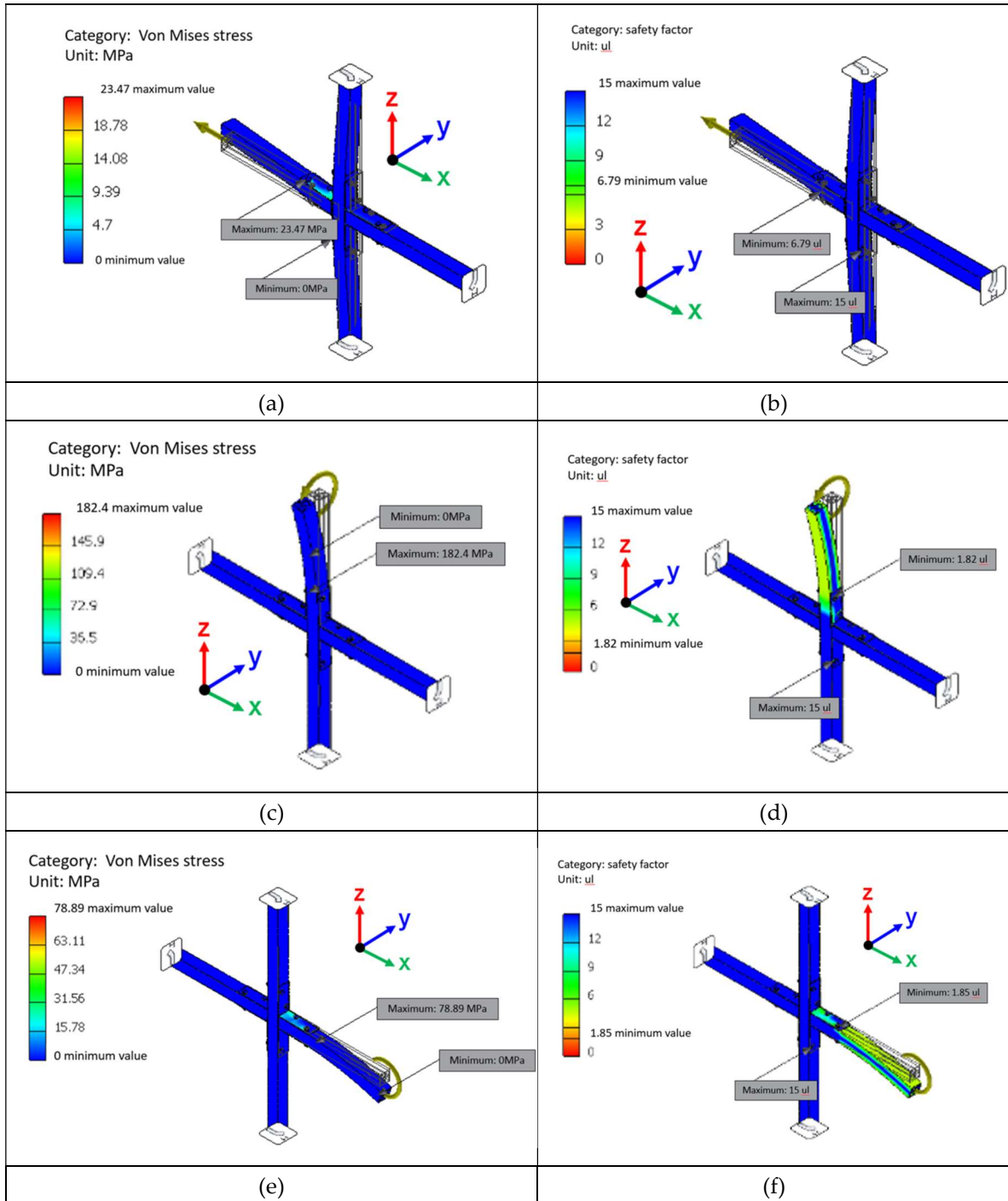


**Figure S7.** Fastener F (a) von Mises stress and (b) safety factor under axial tension (c) von Mises stress and (d) safety factor under X-axis bending moment (e) von Mises stress and (f) safety factor under Y-axis bending moment

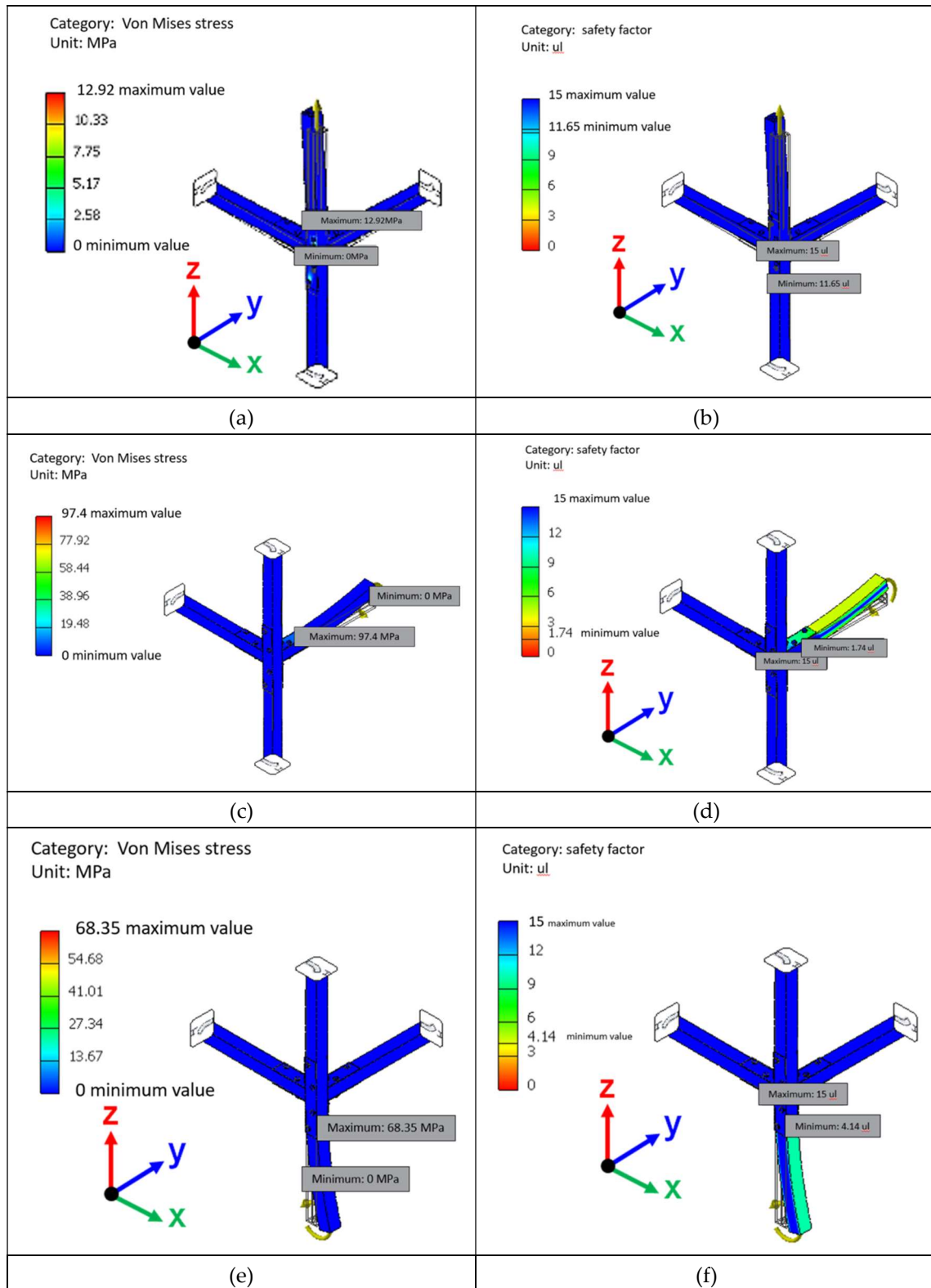




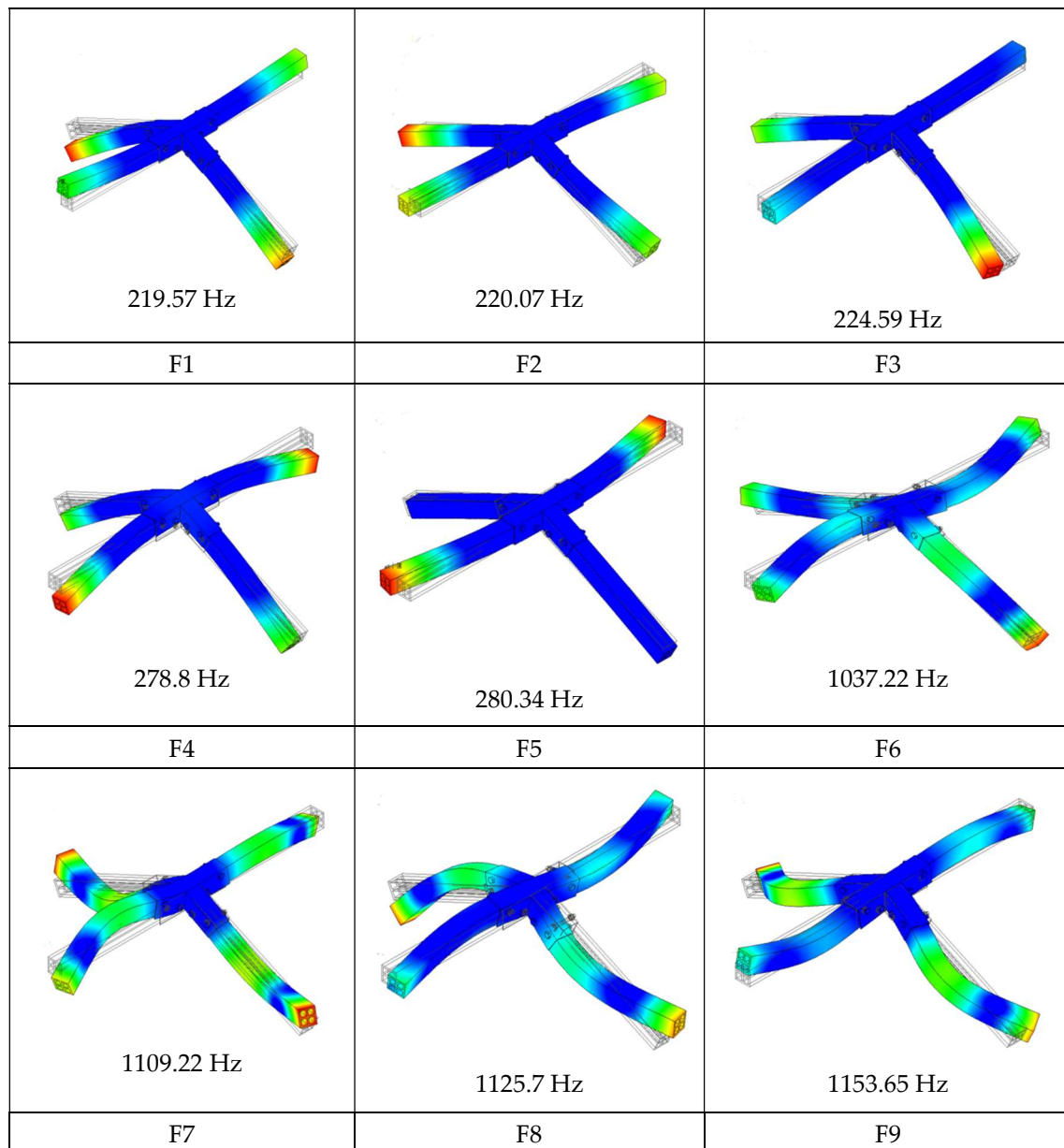
**Figure S8.** Fastener G1 (a) von Mises stress and (b) safety factor under axial tension (c) von Mises stress and (d) safety factor under X-axis bending moment (e) von Mises stress and (f) safety factor under Y-axis bending moment



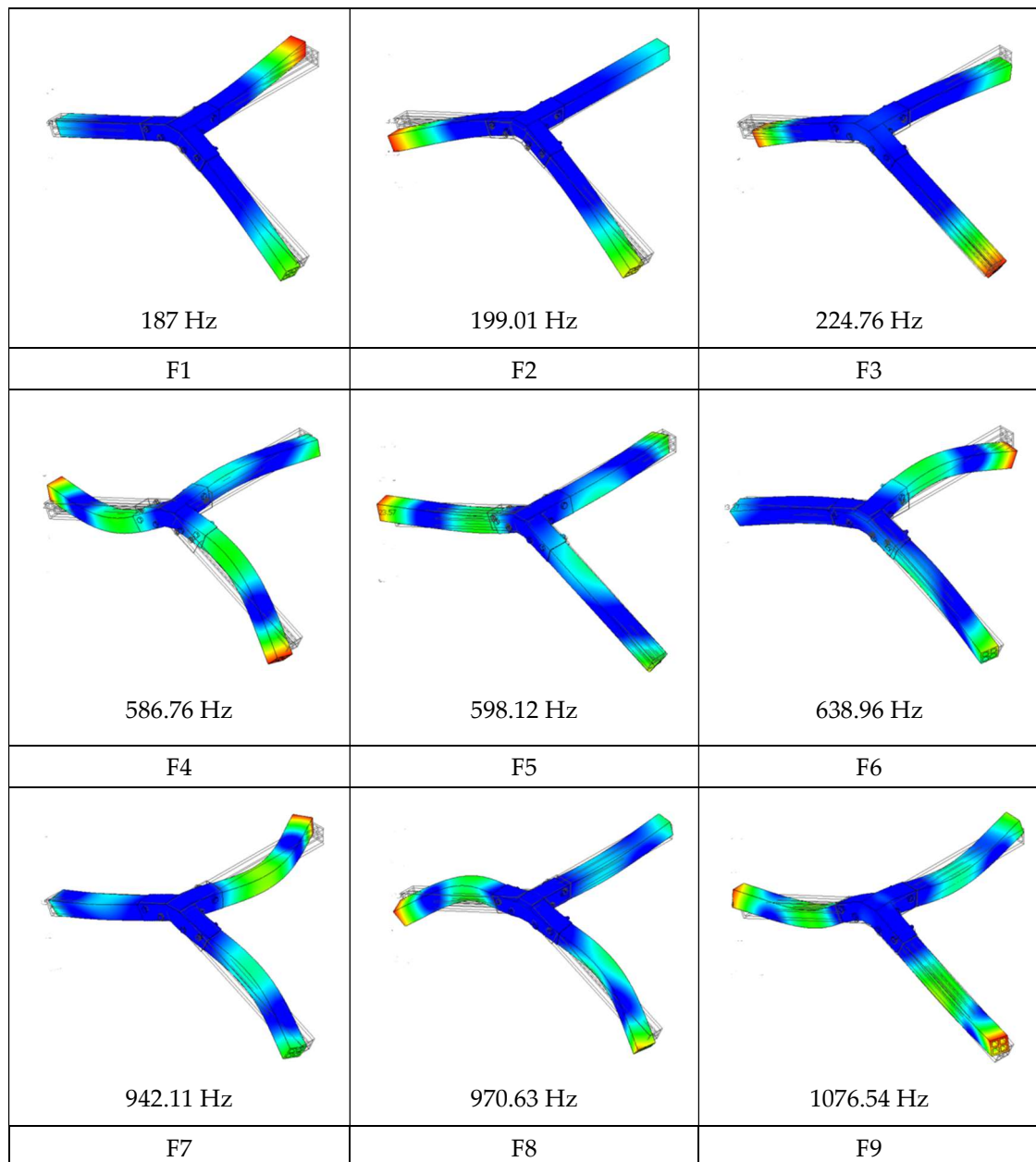
**Figure S9.** Fastener G2 (a) von Mises stress and (b) safety factor under axial tension (c) von Mises stress and (d) safety factor under X-axis bending moment (e) von Mises stress and (f) safety factor under Y-axis bending moment



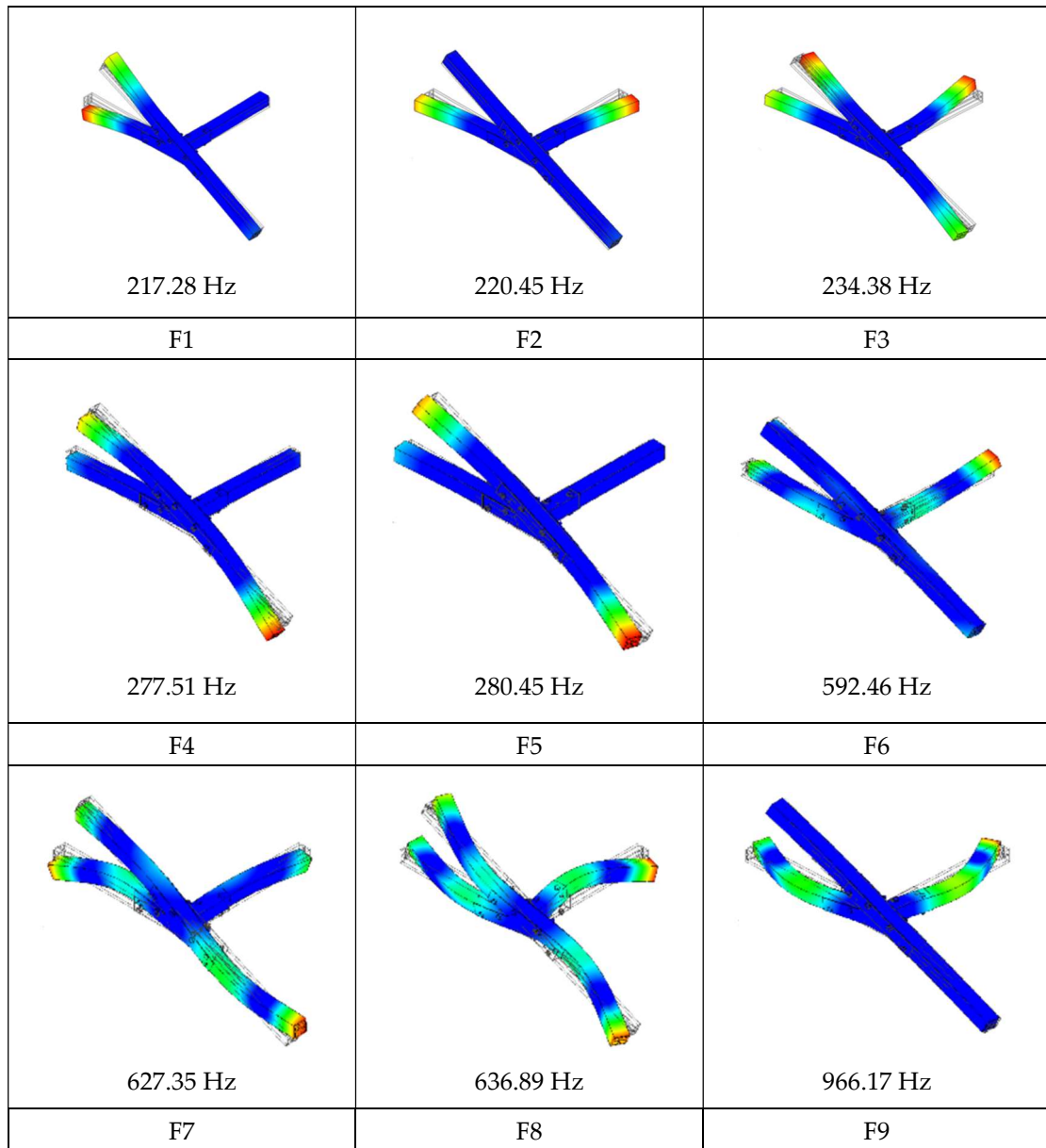
**Figure S10.** Fastener H (a) von Mises stress and (b) safety factor under axial tension (c) von Mises stress and (d) safety factor under X-axis bending moment (e) von Mises stress and (f) safety factor under Y-axis bending moment



**Figure S11.** The resonant frequencies and corresponding mode shapes in Fastener A

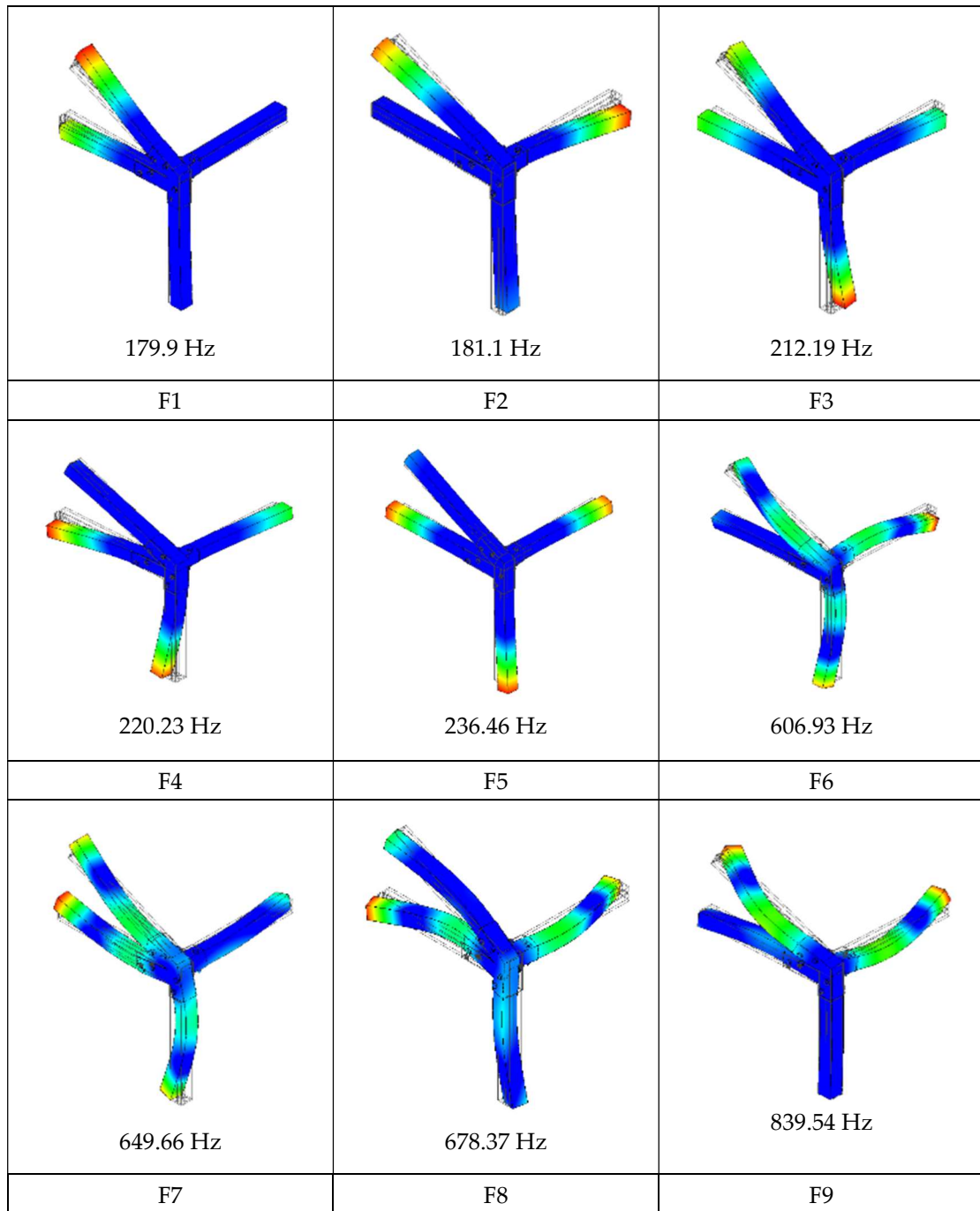


**Figure S12.** The resonant frequencies and corresponding mode shapes in Fastener B

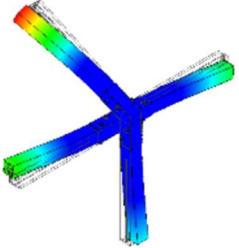
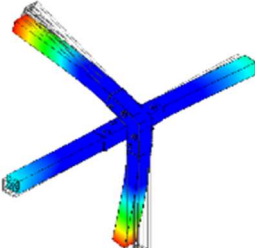
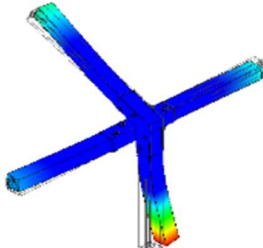
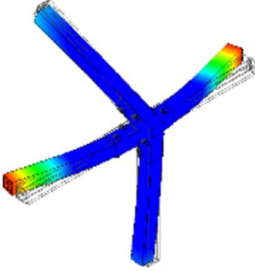
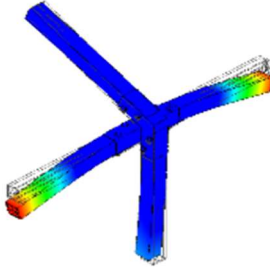
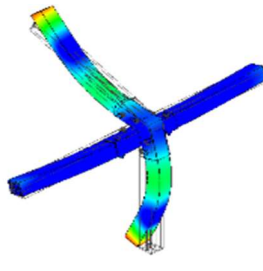
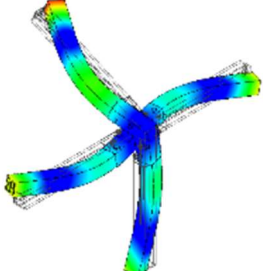
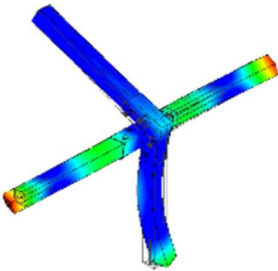
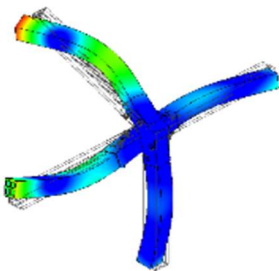


**Figure S13.** The resonant frequencies and corresponding mode shapes in Fastener C

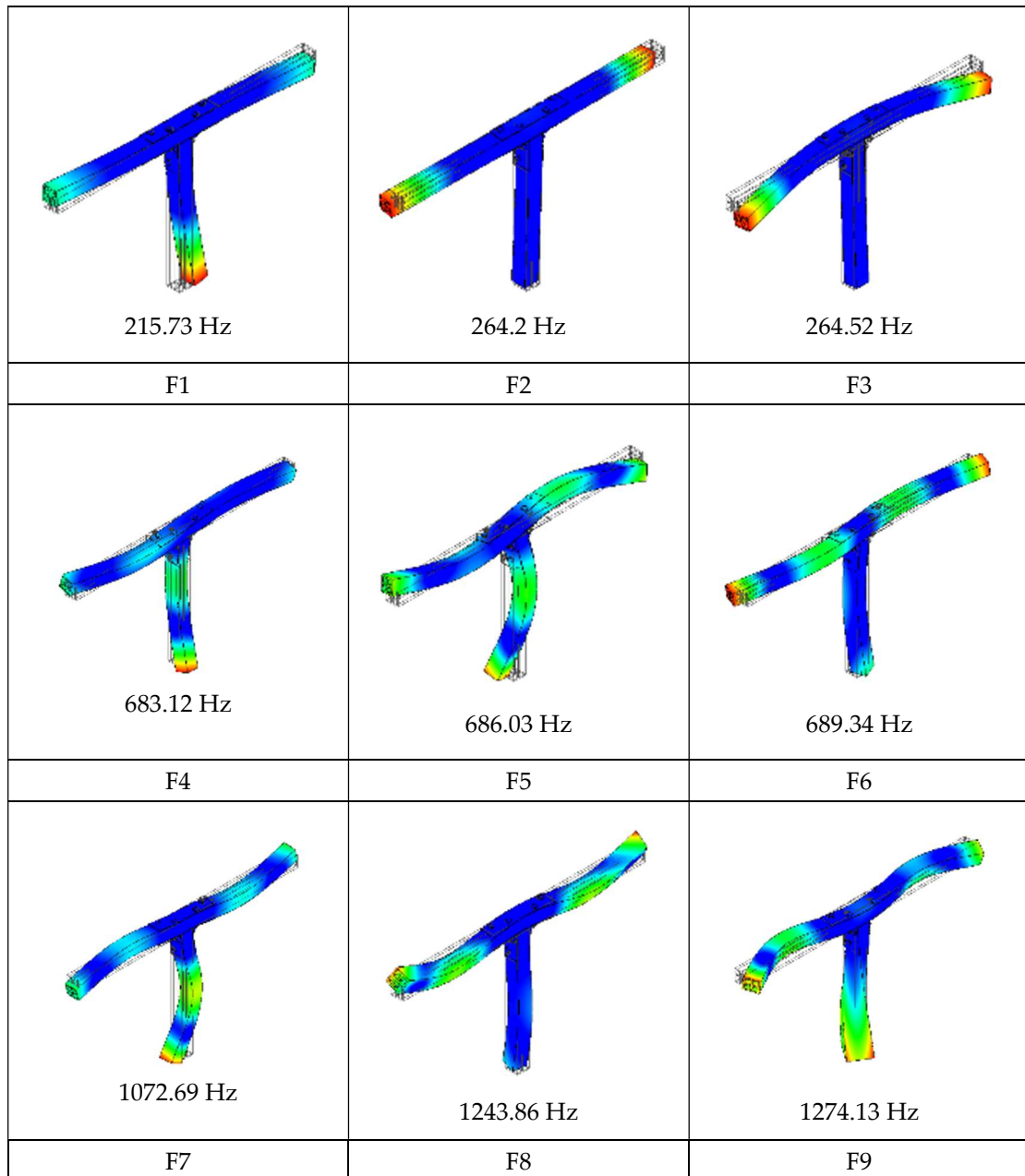




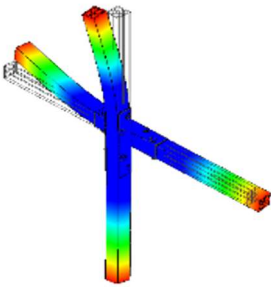
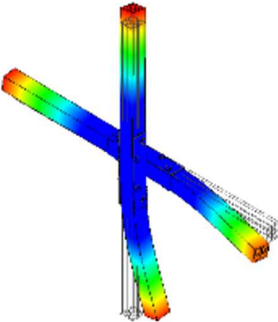
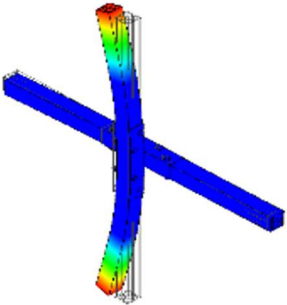
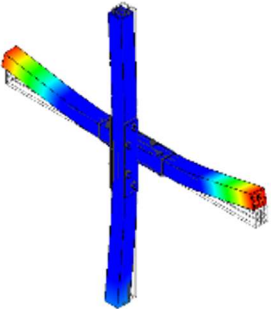
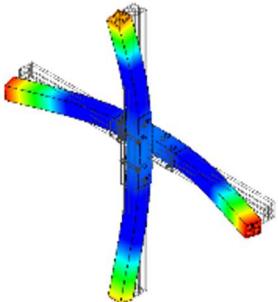
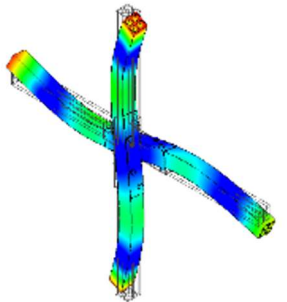
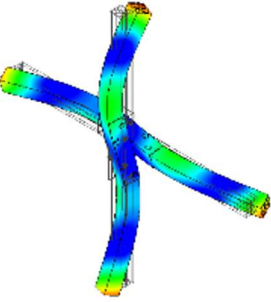
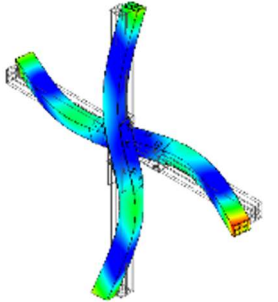
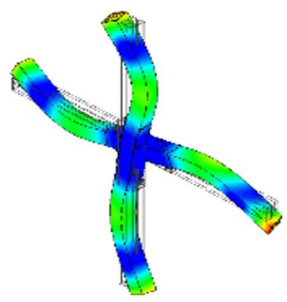
**Figure S14.** The resonant frequencies and corresponding mode shapes in Fastener D

 194.82 Hz	 196.17 Hz	 223.53 Hz
F1	F2	F3
 249.13 Hz	 261.19 Hz	 655.45 Hz
F4	F5	F6
 671.46 Hz	 716.4 Hz	 923.45 Hz
F7	F8	F9

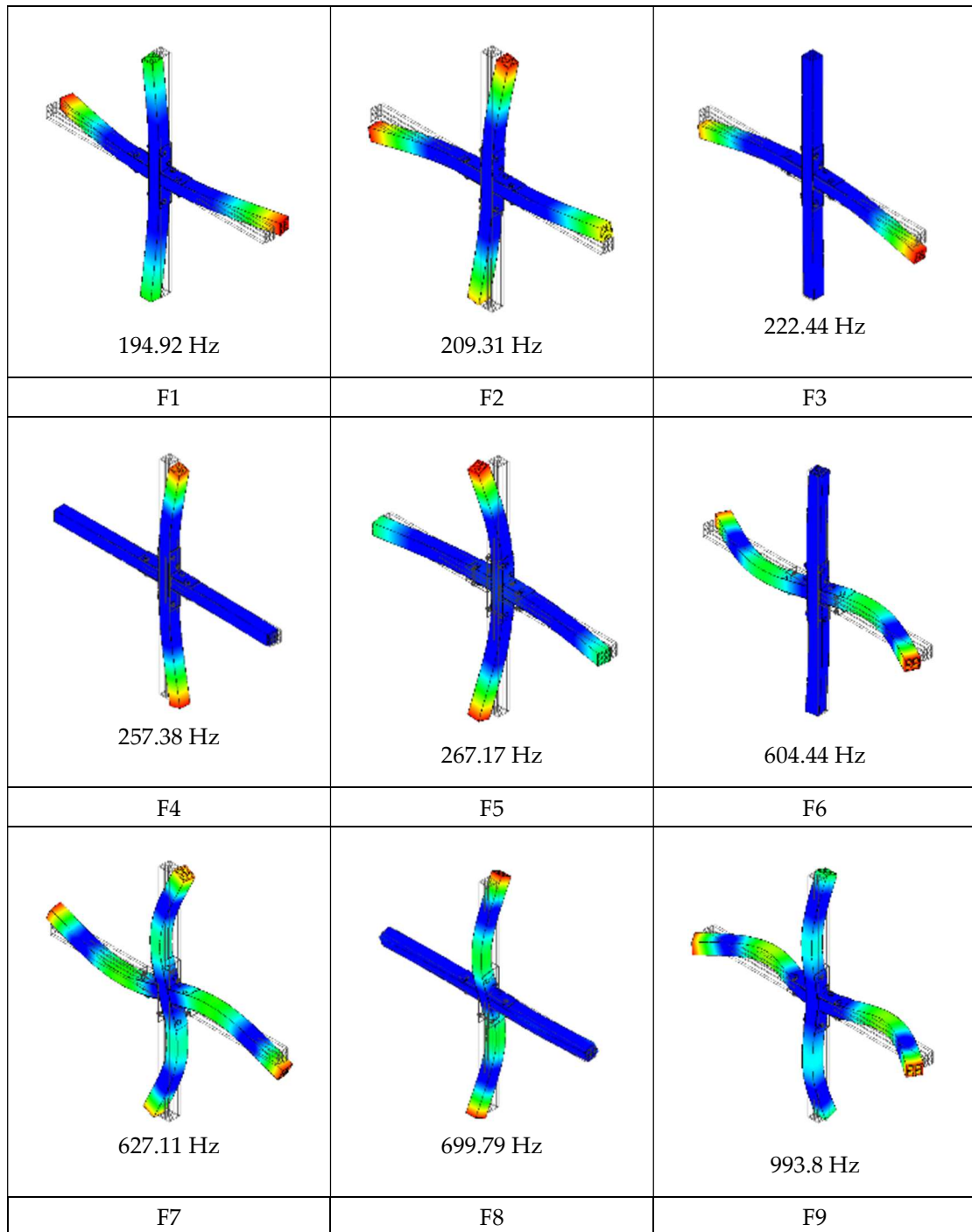
**Figure S15.** The resonant frequencies and corresponding mode shapes in Fastener E



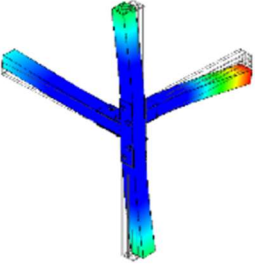
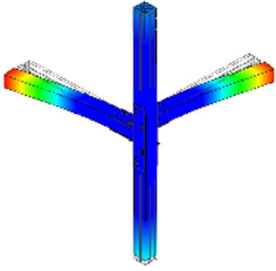
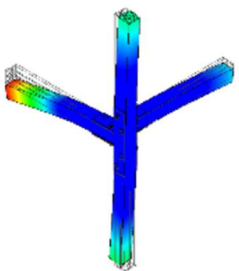
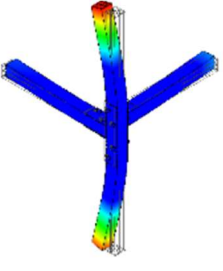
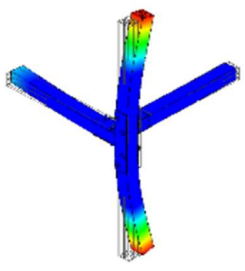
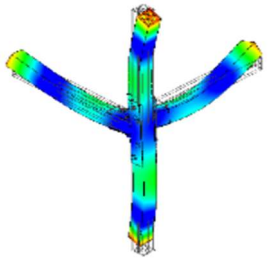
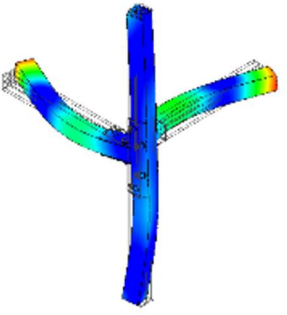
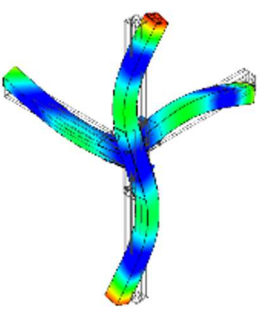
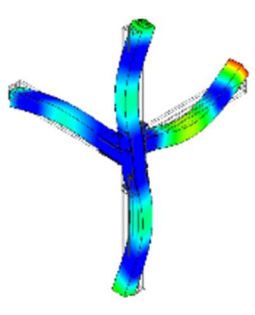
**Figure S16.** The resonant frequencies and corresponding mode shapes in Fastener F

 214.64 Hz	 216.31 Hz	 253.71 Hz
F1	F2	F3
 257.22 Hz	 272.97 Hz	 692.2 Hz
F4	F5	F6
 705.02 Hz	 705.42 Hz	 1056.12 Hz
F7	F8	F9

**Figure S17.** The resonant frequencies and corresponding mode shapes in Fastener G1



**Figure S18.** The resonant frequencies and corresponding mode shapes in Fastener G2

 202.84 Hz F1	 204.81 Hz F2	 222.58 Hz F3
 249.18 Hz F4	 264.43 Hz F5	 659.33 Hz F6
 662.78 Hz F7	 679.57 Hz F8	 1005.71 Hz F9

**Figure S19.** The resonant frequencies and corresponding mode shapes in Fastener H