Supplementary Materials

Fatigue resistance of different 3D-printed patterns and infills using PLA

Table S1. Complete specimen breakdown, exclusions, and valid retained samples per pattern.

Pattern Code	Nominal Infill	Tested Specs	Valid Specs	Exclusions	Physical Reason for Exclusion (ASTM E178)
A100 - F100 (6 patterns)	**100%**	**24 (4 each)**	**24**	**0**	**None (All specimens valid)**
A99	99%	5*	3	2	1 jaw slippage; 1 dynamic runout (>0.025 mm)
B99	99%	5*	4	1	1 jaw slippage
C99 - E99 (3 patterns)	**99%**	**12 (4 each)**	**12**	**0**	**None (All specimens valid)**
F99	99%	4	3	1	1 dynamic runout (>0.025 mm)
N99 - P99 (3 patterns)	**99%**	**12 (4 each)**	**12**	**0**	**None (All specimens valid)**
R99	99%	5*	4	1	1 dynamic runout (>0.025 mm)
S99	99%	4	3	1	1 jaw slippage
T99	99%	4	3	1	1 dynamic runout (>0.025 mm)
U99 (3D Honeycomb)	**99%**	**4**	**4**	**0**	**None (All specimens valid)**
G99	99%	4	3	1	1 jaw slippage
W99	99%	4	3	1	1 dynamic runout (>0.025 mm)
X99	99%	4	3	1	1 jaw slippage
Y99	99%	4	3	1	1 dynamic runout (>0.025 mm)
Z99	99%	5*	3	2	1 jaw slippage; 1 dynamic runout (>0.025 mm)
TOTAL	100% / 99%	100	87	13	13 Total Exclusions (7 Runout + 6 Slippage)

Table S2. Descriptive statistics of fatigue life (cycles to failure) at 20 N and 99% nominal infill density, ordered by mean, with Games–Howell letter groups (patterns sharing a letter do not differ significantly, $\alpha = 0.05$). The last row repeats 3D Honeycomb without the 19,557-cycle specimen (sensitivity analysis).

Code	Pattern	*n*	Mean	SD	CV (%)	Min	Max	Group
U	3D Honeycomb	4	11,678	5,710	48.9	6,419	19,557	*abcde*
R	Cubic	4	7,310	1,537	21.0	5,658	9,278	*ab*
Z	Zig Zag	3	5,732	551	9.6	5,218	6,314	*a*
B	Aligned Rectilinear	4	5,457	1,357	24.9	3,604	6,833	*abcd*
N	Grid	4	5,436	2,301	42.3	2,480	8,101	*abcde*
P	Stars	4	4,710	1,510	32.1	3,056	6,067	*abcde*
O	Triangles	4	3,468	1,648	47.5	2,118	5,869	*abcde*
C	Concentric	4	2,984	1,618	54.2	899	4,621	*abcde*
A	Rectilinear	3	2,841	310	10.9	2,497	3,099	*bc*
S	Line	3	2,593	158	6.1	2,482	2,774	*abc*
D	Hilbert Curve	4	2,579	1,776	68.9	812	4,468	*abcde*
T	Honeycomb	3	2,416	542	22.4	2,011	3,032	*bcde*
E	Archimedean Chords	4	2,302	1,144	49.7	685	3,371	*abcde*
F	Octagram Spiral	3	1,404	408	29.1	942	1,715	*cde*
W	Adaptive Cubic	3	1,315	547	41.6	687	1,683	*cde*
G	Gyroid	3	1,109	557	50.2	500	1,591	*cde*
X	Support Cubic	3	691	351	50.8	291	949	*de*
Y	Lightning	3	66	14	21.9	54	82	*e*

Code	Pattern	*n*	Mean	SD	CV (%)	Min	Max	Group
U*	3D Honeycomb, without 19,557	3	9,051	2,742	30.3	6,419	11,892	*abcde*

SD, standard deviation; CV, coefficient of variation. Letter groups are identical with and without the 19,557-cycle specimen.

Table S3. Normality of residuals (Shapiro–Wilk) and homogeneity of variances (Levene's test with median centring, Brown–Forsythe variant).

Model	Data	Shapiro–Wilk *W*	*p*	Levene *F* (df)	*p*
One-way, 18 patterns, all specimens	cycles	0.842	1.07×10^{-6}	2.30 (17, 45)	0.013
One-way, 18 patterns, all specimens	$\log_{10}$(cycles)	0.959	0.035	0.91 (17, 45)	0.571
One-way, 18 patterns, without 19,557	cycles	0.968	0.105	1.53 (17, 44)	0.128
One-way, 18 patterns, without 19,557	$\log_{10}$(cycles)	0.954	0.022	0.90 (17, 44)	0.574
Two-way, patterns A–F × infill density	cycles	0.940	0.020	1.58 (11, 34)	0.151
Two-way, patterns A–F × infill density	$\log_{10}$(cycles)	0.930	0.009	1.54 (11, 34)	0.162

For reference, the conventional one-way ANOVA (equal variances assumed) gave $F(17, 45) = 7.87$, $p = 1.48 \times 10^{-8}$ (without 19,557: $F(17, 44) = 10.06$, $p = 4.13 \times 10^{-10}$). Welch's ANOVA without the 19,557-cycle specimen: $F(17, 15.1) = 59.35$, $p = 9.79 \times 10^{-11}$; Kruskal–Wallis: $H(17) = 48.06$, $p = 8.40 \times 10^{-5}$.

Table S4. Games–Howell pairwise comparisons of the 18 patterns at 99% nominal infill density (all 153 pairs, ordered by *p*). Difference = mean of the first pattern minus mean of the second (cycles); df, Welch–Satterthwaite degrees of freedom; * significant at $\alpha = 0.05$. With the 19,557-cycle specimen excluded, the same 17 pairs are significant.

Pair	Difference	95% CI	df	*p*	
Support Cubic (X) – Zig Zag (Z)	−5,042	−7,716 to −2,368	3.4	0.007	*
Line (S) – Lightning (Y)	+2,527	1,489 to 3,565	2.0	0.008	*
Gyroid (G) – Zig Zag (Z)	−4,623	−7,510 to −1,736	4.0	0.009	*
Octagram Spiral (F) – Zig Zag (Z)	−4,328	−6,984 to −1,672	3.7	0.010	*
Adaptive Cubic (W) – Zig Zag (Z)	−4,417	−7,278 to −1,556	4.0	0.010	*
Lightning (Y) – Zig Zag (Z)	−5,666	−9,343 to −1,989	2.0	0.021	*
Rectilinear (A) – Support Cubic (X)	+2,151	409 to 3,892	3.9	0.024	*
Rectilinear (A) – Lightning (Y)	+2,775	711 to 4,839	2.0	0.028	*
Cubic (R) – Lightning (Y)	+7,244	1,276 to 13,212	3.0	0.029	*
Honeycomb (T) – Zig Zag (Z)	−3,316	−6,165 to −467	4.0	0.029	*
Cubic (R) – Gyroid (G)	+6,200	849 to 11,551	4.0	0.030	*
Cubic (R) – Support Cubic (X)	+6,619	999 to 12,239	3.4	0.030	*
Cubic (R) – Adaptive Cubic (W)	+5,994	634 to 11,355	3.9	0.034	*
Octagram Spiral (F) – Cubic (R)	−5,905	−11,440 to −370	3.5	0.041	*
Rectilinear (A) – Zig Zag (Z)	−2,891	−5,621 to −161	3.2	0.042	*
Line (S) – Support Cubic (X)	+1,903	65 to 3,741	2.8	0.046	*
Aligned Rectilinear (B) – Lightning (Y)	+5,391	125 to 10,658	3.0	0.047	*
Line (S) – Zig Zag (Z)	−3,139	−6,373 to 95	2.3	0.053	
Aligned Rectilinear (B) – Support Cubic (X)	+4,767	−131 to 9,665	3.5	0.054	
Archimedean Chords (E) – Cubic (R)	−5,008	−10,204 to 189	5.5	0.059	
Aligned Rectilinear (B) – Gyroid (G)	+4,348	−323 to 9,019	4.2	0.064	
Cubic (R) – Honeycomb (T)	+4,893	−472 to 10,259	3.9	0.068	
Aligned Rectilinear (B) – Adaptive Cubic (W)	+4,142	−536 to 8,819	4.1	0.076	
Archimedean Chords (E) – Zig Zag (Z)	−3,430	−7,346 to 485	4.5	0.081	
Aligned Rectilinear (B) – Octagram Spiral (F)	+4,053	−765 to 8,871	3.7	0.086	
Cubic (R) – Line (S)	+4,716	−1,167 to 10,599	3.1	0.092	
Stars (P) – Lightning (Y)	+4,644	−1,220 to 10,507	3.0	0.094	
Rectilinear (A) – Cubic (R)	−4,468	−10,150 to 1,213	3.3	0.100	
Honeycomb (T) – Lightning (Y)	+2,350	−1,266 to 5,967	2.0	0.114	

Pair	Difference	95% CI	df	p
Stars (P) – Support Cubic (X)	+4,019	−1,493 to 9,531	3.4	0.126
Rectilinear (A) – Octagram Spiral (F)	+1,437	−534 to 3,408	3.7	0.133
Hilbert Curve (D) – Cubic (R)	−4,731	−10,948 to 1,486	5.9	0.154
Stars (P) – Gyroid (G)	+3,600	−1,648 to 8,848	4.0	0.167
Honeycomb (T) – Support Cubic (X)	+1,726	−899 to 4,351	3.4	0.167
Concentric (C) – Cubic (R)	−4,326	−10,191 to 1,540	6.0	0.174
Rectilinear (A) – Gyroid (G)	+1,732	−1,030 to 4,494	3.1	0.175
Grid (N) – Lightning (Y)	+5,370	−3,562 to 14,302	3.0	0.187
Octagram Spiral (F) – Lightning (Y)	+1,338	−1,382 to 4,059	2.0	0.189
Stars (P) – Adaptive Cubic (W)	+3,394	−1,863 to 8,651	4.0	0.197
Aligned Rectilinear (B) – Honeycomb (T)	+3,041	−1,640 to 7,722	4.1	0.200
Octagram Spiral (F) – Stars (P)	−3,305	−8,733 to 2,122	3.6	0.211
Octagram Spiral (F) – Line (S)	−1,189	−3,416 to 1,038	2.6	0.211
Rectilinear (A) – Adaptive Cubic (W)	+1,526	−1,178 to 4,230	3.2	0.228
Aligned Rectilinear (B) – Line (S)	+2,864	−2,308 to 8,036	3.1	0.234
Aligned Rectilinear (B) – Archimedean Chords (E)	+3,155	−1,556 to 7,867	5.8	0.238
Grid (N) – Support Cubic (X)	+4,745	−3,921 to 13,412	3.2	0.246
Triangles (O) – Lightning (Y)	+3,402	−2,995 to 9,799	3.0	0.247
3D Honeycomb (U) – Lightning (Y)	+11,612	−10,556 to 33,779	3.0	0.256
Line (S) – Gyroid (G)	+1,484	−1,789 to 4,757	2.3	0.258
Triangles (O) – Cubic (R)	−3,842	−9,770 to 2,087	6.0	0.269
Archimedean Chords (E) – Lightning (Y)	+2,236	−2,204 to 6,676	3.0	0.279
Rectilinear (A) – Aligned Rectilinear (B)	−2,616	−7,575 to 2,343	3.4	0.287
3D Honeycomb (U) – Support Cubic (X)	+10,987	−11,064 to 33,037	3.0	0.288
Grid (N) – Gyroid (G)	+4,327	−4,037 to 12,691	3.5	0.304
3D Honeycomb (U) – Gyroid (G)	+10,568	−11,312 to 32,448	3.1	0.313
3D Honeycomb (U) – Adaptive Cubic (W)	+10,362	−11,528 to 32,252	3.1	0.326
Line (S) – Adaptive Cubic (W)	+1,278	−1,925 to 4,481	2.3	0.327
Concentric (C) – Lightning (Y)	+2,918	−3,361 to 9,198	3.0	0.330
Octagram Spiral (F) – 3D Honeycomb (U)	−10,273	−32,283 to 11,737	3.0	0.331
Grid (N) – Adaptive Cubic (W)	+4,121	−4,258 to 12,499	3.4	0.338
Adaptive Cubic (W) – Lightning (Y)	+1,249	−2,399 to 4,897	2.0	0.346
Hilbert Curve (D) – Zig Zag (Z)	−3,153	−9,438 to 3,132	3.7	0.351
Octagram Spiral (F) – Grid (N)	−4,032	−12,618 to 4,554	3.2	0.351
Triangles (O) – Support Cubic (X)	+2,778	−3,285 to 8,840	3.4	0.382
Concentric (C) – Zig Zag (Z)	−2,748	−8,414 to 2,918	3.9	0.391
Archimedean Chords (E) – 3D Honeycomb (U)	−9,376	−30,704 to 11,953	3.2	0.400
Honeycomb (T) – 3D Honeycomb (U)	−9,261	−31,156 to 12,633	3.1	0.406
Line (S) – 3D Honeycomb (U)	−9,084	−31,228 to 13,060	3.0	0.420
Hilbert Curve (D) – 3D Honeycomb (U)	−9,099	−29,562 to 11,365	3.6	0.433
Rectilinear (A) – 3D Honeycomb (U)	−8,836	−30,912 to 13,240	3.0	0.441
Honeycomb (T) – Gyroid (G)	+1,307	−1,557 to 4,171	4.0	0.459
Gyroid (G) – Lightning (Y)	+1,043	−2,670 to 4,757	2.0	0.463
Concentric (C) – 3D Honeycomb (U)	−8,693	−29,376 to 11,989	3.5	0.468
Stars (P) – Honeycomb (T)	+2,293	−2,969 to 7,555	3.9	0.495
Support Cubic (X) – Lightning (Y)	+625	−1,713 to 2,962	2.0	0.496
Hilbert Curve (D) – Lightning (Y)	+2,513	−4,382 to 9,408	3.0	0.513
Triangles (O) – 3D Honeycomb (U)	−8,209	−28,850 to 12,431	3.5	0.519
Stars (P) – Line (S)	+2,116	−3,661 to 7,893	3.1	0.524
Concentric (C) – Support Cubic (X)	+2,294	−3,648 to 8,235	3.4	0.526

Pair	Difference	95% CI	df	p
Triangles (O) – Gyroid (G)	+2,359	−3,418 to 8,136	3.8	0.543
Archimedean Chords (E) – Support Cubic (X)	+1,611	−2,442 to 5,664	3.7	0.550
Aligned Rectilinear (B) – Hilbert Curve (D)	+2,878	−3,151 to 8,907	5.6	0.556
Archimedean Chords (E) – Stars (P)	−2,408	−7,527 to 2,712	5.6	0.570
Octagram Spiral (F) – Honeycomb (T)	−1,012	−3,627 to 1,603	3.7	0.575
Triangles (O) – Zig Zag (Z)	−2,264	−8,047 to 3,519	3.8	0.580
Grid (N) – Honeycomb (T)	+3,020	−5,366 to 11,406	3.4	0.597
Honeycomb (T) – Adaptive Cubic (W)	+1,101	−1,736 to 3,938	4.0	0.610
Archimedean Chords (E) – Grid (N)	−3,134	−10,912 to 4,644	4.4	0.621
Stars (P) – Cubic (R)	−2,600	−8,259 to 3,059	6.0	0.624
Triangles (O) – Adaptive Cubic (W)	+2,153	−3,635 to 7,941	3.8	0.625
Grid (N) – Line (S)	+2,843	−6,031 to 11,716	3.0	0.626
Octagram Spiral (F) – Triangles (O)	−2,064	−8,040 to 3,912	3.5	0.640
Rectilinear (A) – Stars (P)	−1,868	−7,442 to 3,706	3.3	0.642
Aligned Rectilinear (B) – Concentric (C)	+2,473	−3,136 to 8,082	5.8	0.655
Stars (P) – 3D Honeycomb (U)	−6,968	−27,800 to 13,864	3.4	0.658
Octagram Spiral (F) – Support Cubic (X)	+714	−1,297 to 2,724	3.9	0.679
Rectilinear (A) – Grid (N)	−2,595	−11,314 to 6,125	3.1	0.707
Concentric (C) – Gyroid (G)	+1,875	−3,785 to 7,535	3.9	0.734
Aligned Rectilinear (B) – 3D Honeycomb (U)	−6,220	−27,265 to 14,825	3.3	0.746
Hilbert Curve (D) – Support Cubic (X)	+1,888	−4,686 to 8,463	3.3	0.763
3D Honeycomb (U) – Zig Zag (Z)	+5,945	−15,940 to 27,831	3.1	0.763
Grid (N) – 3D Honeycomb (U)	−6,242	−26,039 to 13,556	3.9	0.782
Hilbert Curve (D) – Grid (N)	−2,857	−10,682 to 4,968	5.6	0.816
Concentric (C) – Adaptive Cubic (W)	+1,669	−4,002 to 7,340	3.8	0.820
Cubic (R) – Zig Zag (Z)	+1,577	−3,779 to 6,934	3.9	0.830
Concentric (C) – Octagram Spiral (F)	+1,580	−4,275 to 7,435	3.5	0.833
Aligned Rectilinear (B) – Triangles (O)	+1,989	−3,697 to 7,675	5.8	0.855
Archimedean Chords (E) – Gyroid (G)	+1,193	−2,723 to 5,109	4.5	0.862
Hilbert Curve (D) – Stars (P)	−2,131	−8,314 to 4,053	5.8	0.869
Aligned Rectilinear (B) – Cubic (R)	−1,853	−7,269 to 3,564	5.9	0.876
Concentric (C) – Grid (N)	−2,452	−10,175 to 5,271	5.4	0.893
Adaptive Cubic (W) – Support Cubic (X)	+625	−2,026 to 3,275	3.4	0.898
Hilbert Curve (D) – Gyroid (G)	+1,470	−4,808 to 7,748	3.7	0.929
Cubic (R) – 3D Honeycomb (U)	−4,368	−25,162 to 16,427	3.4	0.944
Concentric (C) – Stars (P)	−1,725	−7,547 to 4,096	6.0	0.946
Archimedean Chords (E) – Adaptive Cubic (W)	+987	−2,929 to 4,902	4.5	0.946
Archimedean Chords (E) – Octagram Spiral (F)	+898	−3,089 to 4,885	3.9	0.953
Hilbert Curve (D) – Adaptive Cubic (W)	+1,264	−5,027 to 7,554	3.7	0.970
Grid (N) – Triangles (O)	+1,968	−5,770 to 9,706	5.4	0.972
Hilbert Curve (D) – Octagram Spiral (F)	+1,175	−5,314 to 7,663	3.4	0.976
Grid (N) – Cubic (R)	−1,874	−9,568 to 5,820	5.2	0.976
Rectilinear (A) – Line (S)	+248	−1,324 to 1,820	3.0	0.978
Stars (P) – Zig Zag (Z)	−1,023	−6,276 to 4,230	4.0	0.983
Rectilinear (A) – Honeycomb (T)	+425	−2,251 to 3,101	3.2	0.985
Triangles (O) – Honeycomb (T)	+1,052	−4,742 to 6,846	3.8	0.987
Gyroid (G) – Support Cubic (X)	+419	−2,285 to 3,123	3.4	0.991
Archimedean Chords (E) – Triangles (O)	−1,166	−6,691 to 4,359	5.3	0.993
Triangles (O) – Line (S)	+875	−5,442 to 7,192	3.1	0.993
Triangles (O) – Stars (P)	−1,241	−7,127 to 4,645	6.0	0.996

Pair	Difference	95% CI	df	p
Rectilinear (A) – Archimedean Chords (E)	+539	−3,569 to 4,648	3.6	0.999
Rectilinear (A) – Triangles (O)	−627	−6,750 to 5,496	3.3	>0.999
Octagram Spiral (F) – Gyroid (G)	+295	−2,387 to 2,977	3.7	>0.999
Aligned Rectilinear (B) – Stars (P)	+748	−4,607 to 6,102	5.9	>0.999
Hilbert Curve (D) – Triangles (O)	−889	−7,264 to 5,486	6.0	>0.999
Concentric (C) – Honeycomb (T)	+568	−5,108 to 6,244	3.8	>0.999
Concentric (C) – Archimedean Chords (E)	+682	−4,751 to 6,115	5.4	>0.999
Line (S) – Honeycomb (T)	+177	−2,992 to 3,346	2.3	>0.999
Archimedean Chords (E) – Line (S)	−291	−4,622 to 4,039	3.2	>0.999
Concentric (C) – Line (S)	+391	−5,808 to 6,589	3.1	>0.999
Grid (N) – Stars (P)	+727	−6,961 to 8,414	5.2	>0.999
Gyroid (G) – Adaptive Cubic (W)	−206	−3,082 to 2,670	4.0	>0.999
Concentric (C) – Triangles (O)	−484	−6,548 to 5,580	6.0	>0.999
Aligned Rectilinear (B) – Zig Zag (Z)	−275	−4,950 to 4,400	4.2	>0.999
Rectilinear (A) – Hilbert Curve (D)	+262	−6,372 to 6,897	3.2	>0.999
Concentric (C) – Hilbert Curve (D)	+405	−5,923 to 6,734	5.9	>0.999
Grid (N) – Zig Zag (Z)	−296	−8,669 to 8,076	3.4	>0.999
Hilbert Curve (D) – Archimedean Chords (E)	+277	−5,653 to 6,207	5.1	>0.999
Octagram Spiral (F) – Adaptive Cubic (W)	+89	−2,548 to 2,726	3.7	>0.999
Rectilinear (A) – Concentric (C)	−143	−6,146 to 5,860	3.3	>0.999
Hilbert Curve (D) – Honeycomb (T)	+163	−6,134 to 6,459	3.7	>0.999
Archimedean Chords (E) – Honeycomb (T)	−114	−4,030 to 3,801	4.5	>0.999
Aligned Rectilinear (B) – Grid (N)	+21	−7,664 to 7,707	4.9	>0.999
Hilbert Curve (D) – Line (S)	−14	−6,834 to 6,806	3.1	>0.999

p-values were computed from the studentized range distribution (SciPy 1.15.3) and checked by numerical integration and Monte Carlo simulation; for pairs with about 2 degrees of freedom, R's ptukey() gives slightly different values, without changing any significance decision.

Table S5. Weibull parameters estimated by maximum likelihood (MLE, used in the revised manuscript) and by median-rank regression (MRR, used in the original submission), ordered by the MLE modulus.

Code	Pattern	n	m MLE (95% CI)	η MLE (95% CI)	m MRR	η MRR	R^2 MRR
S	Line	3	20.6 (6.8–43.8)	2,658 (2,444–2,888)	14.4	2,674	0.798
A	Rectilinear	3	14.7 (4.5–33.6)	2,953 (2,607–3,340)	8.5	2,987	0.966
Z	Zig Zag	3	14.1 (4.5–30.3)	5,945 (5,248–6,724)	10.0	5,984	0.974
Y	Lightning	3	6.0 (2.0–13.0)	71 (53–94)	4.4	72	0.926
R	Cubic	4	6.0 (2.4–11.6)	7,876 (6,251–9,837)	4.8	7,949	0.977
B	Aligned Rectilinear	4	5.8 (2.2–11.9)	5,918 (4,631–7,505)	3.6	6,078	0.941
T	Honeycomb	3	5.8 (1.9–12.4)	2,607 (1,935–3,502)	4.1	2,656	0.856
F	Octagram Spiral	3	5.5 (1.6–13.0)	1,533 (1,090–2,150)	2.9	1,595	0.919
P	Stars	4	4.3 (1.6–8.8)	5,207 (3,718–7,189)	2.9	5,342	0.913
W	Adaptive Cubic	3	3.7 (1.1–8.9)	1,469 (877–2,451)	1.8	1,576	0.866
N	Grid	4	3.1 (1.2–6.2)	6,096 (3,853–9,502)	1.9	6,410	0.911
G	Gyroid	3	2.8 (0.8–6.5)	1,251 (646–2,410)	1.5	1,339	0.947
X	Support Cubic	3	2.8 (0.8–6.7)	779 (396–1,522)	1.4	849	0.889
O	Triangles	4	2.6 (1.0–4.9)	3,922 (2,321–6,500)	2.1	4,026	0.832
E	Archimedean Chords	4	2.6 (0.9–5.5)	2,586 (1,458–4,520)	1.3	2,861	0.852
U	3D Honeycomb	4	2.6 (1.0–4.9)	13,218 (7,707–22,211)	2.1	13,488	0.954
C	Concentric	4	2.3 (0.8–4.8)	3,366 (1,785–6,219)	1.3	3,623	0.940
D	Hilbert Curve	4	1.7 (0.7–3.6)	2,904 (1,276–6,389)	1.2	3,071	0.934
U*	3D Honeycomb, without 19,557	3	4.6 (1.5–10.0)	9,934 (6,753–14,553)	3.1	10,158	0.996

MRR uses Bernard's median ranks, $F_i = (i - 0.3)/(n + 0.4)$. With three or four specimens, MLE and MRR estimates differ considerably and neither is precise; the confidence intervals show the uncertainty.

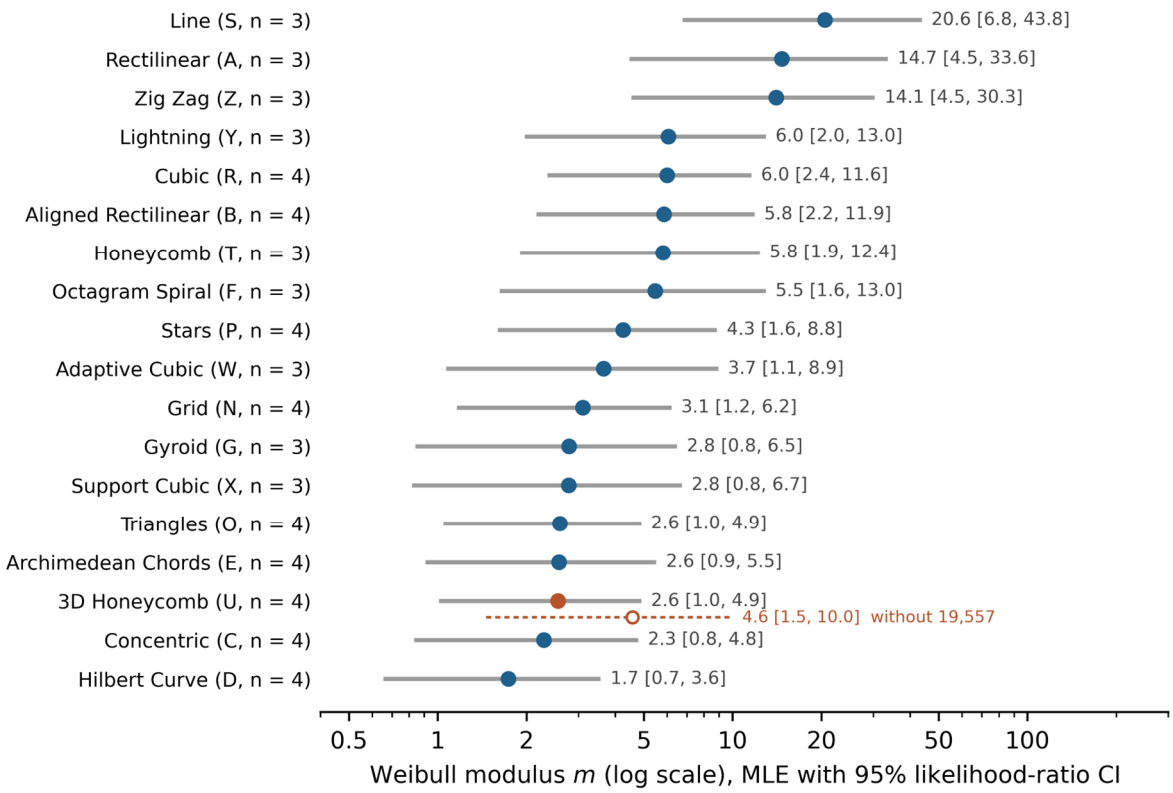

Figure S1. Weibull modulus m of the 18 patterns (maximum-likelihood estimates with 95% profile likelihood-ratio confidence intervals, log scale). The open marker shows 3D Honeycomb without the 19,557-cycle specimen.

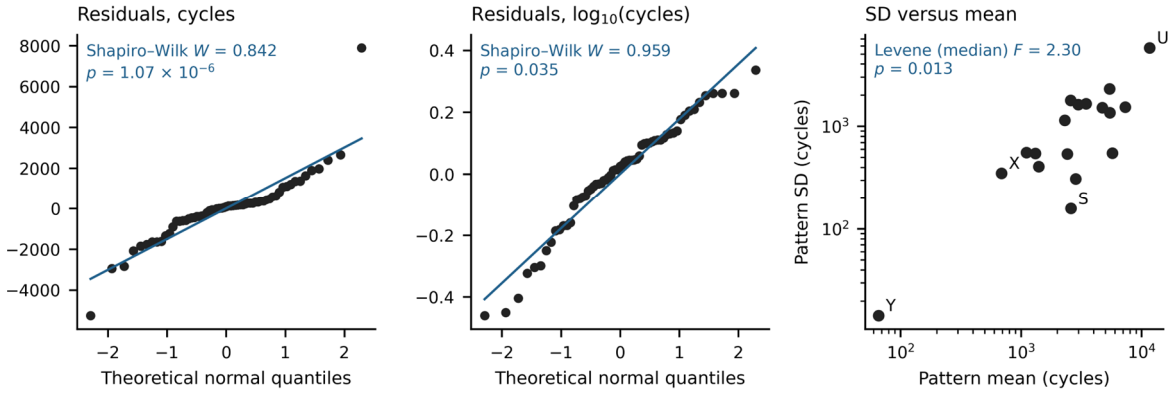

Figure S2. Residual diagnostics for the one-way model at 99% nominal infill density: normal Q–Q plots of residuals on the cycle and $\log_{10}$ scales, and pattern standard deviation versus pattern mean.

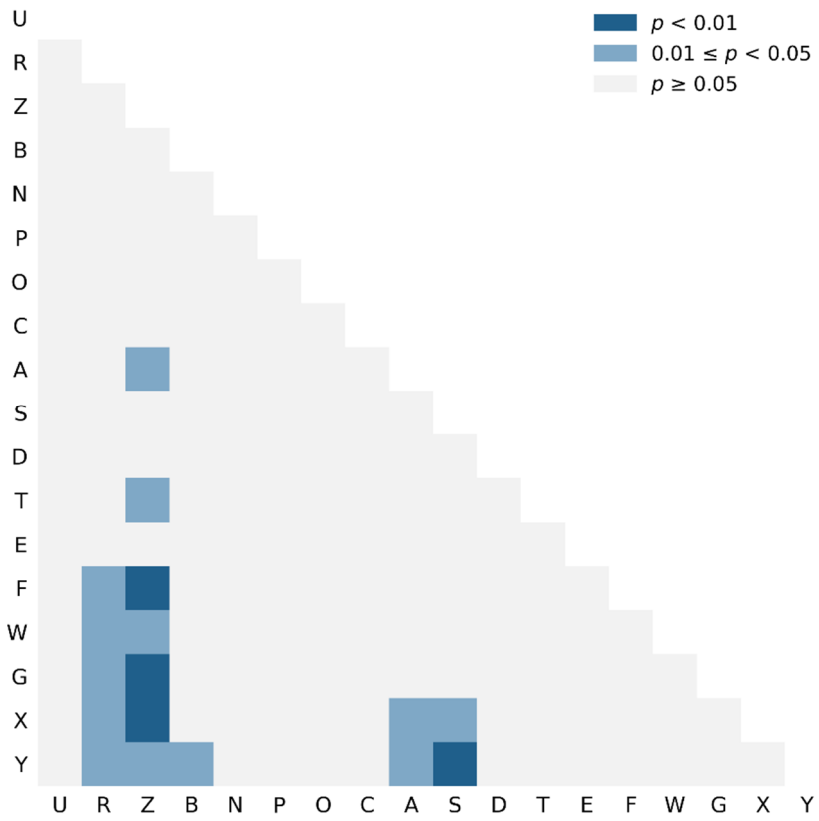

Figure S3. Games–Howell *p*-values for all pairs of patterns, ordered by mean fatigue life (highest first).