

This file is a supplementary material for: Increasing 3D elongation potential in fixed blank forming via fiber curlation (Laukala T, Tanninen P, Aghamohammadi G, Leminen V). The file contains one table and five figures prepared to supplement the paper.

Table 1 Recorded fiber morphology parameters of pulps used to prepare the handsheets and the related 95% confidence values calculated from 3 measurements

	Length [mm]	Width [μm]	Fines [%]	Kink angle [°]	Kink index	Segment Length [mm]	curl index [%]
Hardwood, series 1							
1-HW1	0.95±0.01	20.6±0.1	3.1±0.1	50.0±0.9	1.276±0.015	0.76±0.00	10.5±0.5
2-HW1	0.95±0.00	20.4±0.1	3.1±0.4	50.4±0.6	1.315±0.049	0.75±0.01	10.6±0.5
3a-HW1	0.95±0.01	20.7±0.1	3.2±0.0	52.4±0.9	1.593±0.030	0.71±0.01	12.1±0.2
3b-HW1	0.95±0.00	20.6±0.0	3.2±0.1	53.5±1.0	1.740±0.013	0.70±0.00	12.8±0.2
4a-HW1	0.94±0.00	20.7±0.0	3.1±0.0	53.1±0.7	1.634±0.016	0.71±0.01	12.1±0.0
4b-HW1	0.95±0.01	20.6±0.1	3.1±0.3	53.8±0.5	1.759±0.039	0.69±0.00	13.0±0.2
5-HW1	0.94±0.01	20.6±0.0	3.1±0.1	52.8±0.4	1.646±0.019	0.71±0.01	12.1±0.5
6-HW1	0.95±0.02	20.7±0.0	3.2±0.1	53.3±0.7	1.731±0.036	0.70±0.00	12.8±0.4
7-HW1	0.92±0.01	20.6±0.1	2.9±0.1	55.6±0.4	2.023±0.056	0.65±0.01	13.7±0.2
8-HW1	0.93±0.01	20.6±0.1	2.8±0.1	55.7±0.0	2.003±0.018	0.66±0.00	14.0±0.2
9-HW1	0.94±0.01	20.4±0.1	2.9±0.0	54.9±1.1	1.816±0.032	0.68±0.00	13.1±0.3
10-HW1	0.93±0.02	20.5±0.0	3.1±0.0	54.4±0.9	1.772±0.062	0.69±0.01	12.8±0.4
11-HW1	0.93±0.01	20.6±0.0	3.0±0.1	56.0±0.4	2.104±0.023	0.65±0.00	14.5±0.4
12-HW1	0.93±0.01	20.6±0.1	3.0±0.0	55.6±0.7	2.053±0.004	0.65±0.01	14.1±0.2
Softwood, series 1							
1-SW1	2.06±0.04	28.7±0.1	5.1±0.5	57.5±0.5	1.275±0.017	1.52±0.02	16.3±0.6
2-SW1	2.07±0.01	28.8±0.0	5.1±0.4	57.5±1.0	1.227±0.041	1.54±0.04	16.1±0.5
3-SW1	2.06±0.04	28.9±0.1	5.1±0.0	58.1±1.1	1.364±0.028	1.48±0.03	16.9±0.4
4-SW1	2.07±0.02	28.8±0.0	5.3±0.5	57.5±0.8	1.355±0.009	1.49±0.01	16.9±0.4
5-SW1	2.05±0.05	28.5±0.0	5.2±0.1	59.8±1.0	1.442±0.062	1.47±0.06	18.0±0.0
6-SW1	2.06±0.05	29.0±0.3	5.4±0.7	58.3±2.7	1.466±0.116	1.45±0.04	17.6±1.0
7-SW1	2.04±0.05	28.7±0.0	5.0±0.2	60.2±1.0	1.912±0.046	1.29±0.02	21.1±0.6
8-SW1	2.03±0.02	28.7±0.1	5.1±0.0	60.5±0.7	2.001±0.014	1.26±0.01	21.3±0.6
9-SW1	2.01±0.01	28.2±0.0	5.1±0.4	60.1±0.8	1.850±0.038	1.30±0.03	20.4±0.4
10-SW1	2.04±0.04	28.6±0.0	5.1±0.1	60.0±0.1	1.905±0.038	1.29±0.03	20.6±0.7
Softwood, series 2							
1-SW2	2.08±0.03	28.9±0.2	5.1±0.3	56.6±1.5	0.806±0.057	1.75±0.02	13.4±1.0
2-SW2	2.08±0.05	28.8±0.2	5.3±0.1	56.6±1.3	0.799±0.042	1.75±0.03	13.3±0.7
3-SW2	2.02±0.03	28.5±0.3	5.9±0.0	56.5±0.6	0.850±0.044	1.68±0.03	13.6±0.0
4-SW2	2.04±0.03	28.5±0.0	5.6±0.4	57.0±0.2	0.849±0.020	1.70±0.02	13.7±0.5
5-SW2	2.10±0.03	29.0±0.1	5.0±0.3	56.9±1.5	0.802±0.055	1.77±0.04	13.5±0.0
6-SW2	2.09±0.03	28.8±0.2	5.0±0.3	57.0±0.5	0.805±0.019	1.75±0.03	13.6±0.2
7-SW2	1.97±0.02	28.3±0.0	6.0±0.1	59.9±0.3	1.918±0.025	1.25±0.03	20.9±0.0
8-SW2	1.98±0.04	28.1±0.0	5.8±0.1	60.6±0.3	1.900±0.017	1.26±0.00	20.8±0.2
9-SW2	1.97±0.03	28.1±0.1	6.1±0.4	59.6±0.7	1.962±0.046	1.23±0.02	20.8±0.6
10-SW2	1.98±0.04	28.3±0.1	6.0±0.1	59.8±0.5	2.031±0.040	1.21±0.02	21.3±0.6
11-SW2	1.97±0.03	28.0±0.3	5.7±0.4	59.8±1.2	1.888±0.009	1.26±0.02	20.4±0.6
12-SW2	1.98±0.01	28.3±0.0	6.1±0.0	59.5±0.8	1.993±0.028	1.22±0.02	21.0±0.2

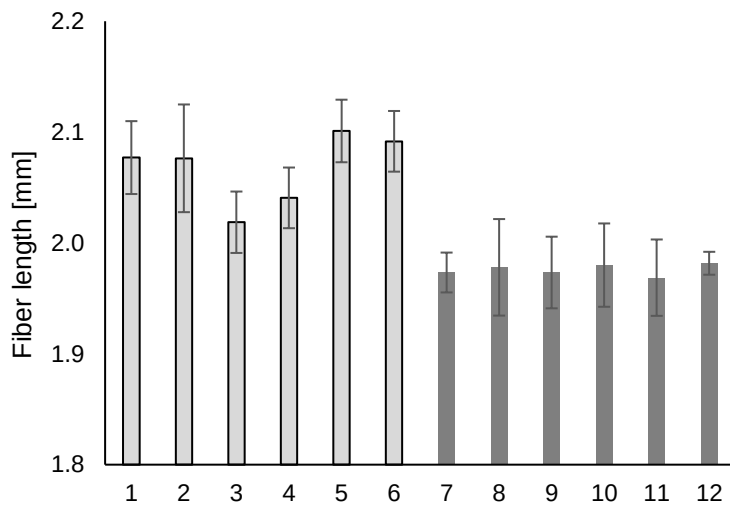


Figure 1 Mean fiber length of softwood pulp used to prepare the handsheets. The x-axis refers to experiment point number of series SW3, i.e. 3 refers to 3-SW3. For clarity, experiment points with curled pulp are marked with dark color without border. The error bars indicate 95 % confidence value based on 3 measurements.

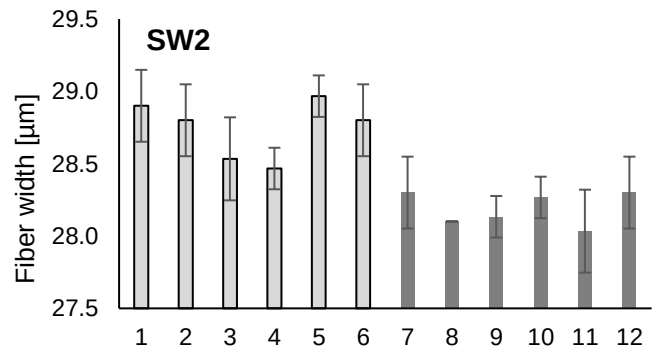
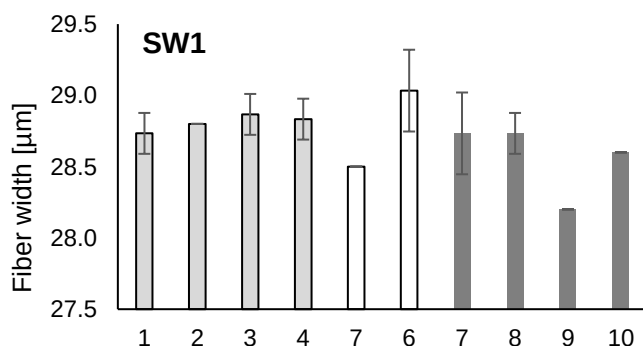
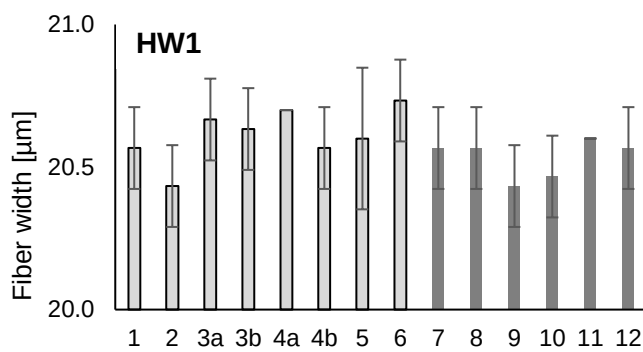


Figure 2 Mean fiber width of pulps used to prepare the handsheets. The identifier in each graph indicates the handsheet series. For clarity, experiment points with medium curlation are marked using white bars with black border and points with high curlation with dark bar without border. The error bars indicate 95 % confidence value based on 3 measurements.

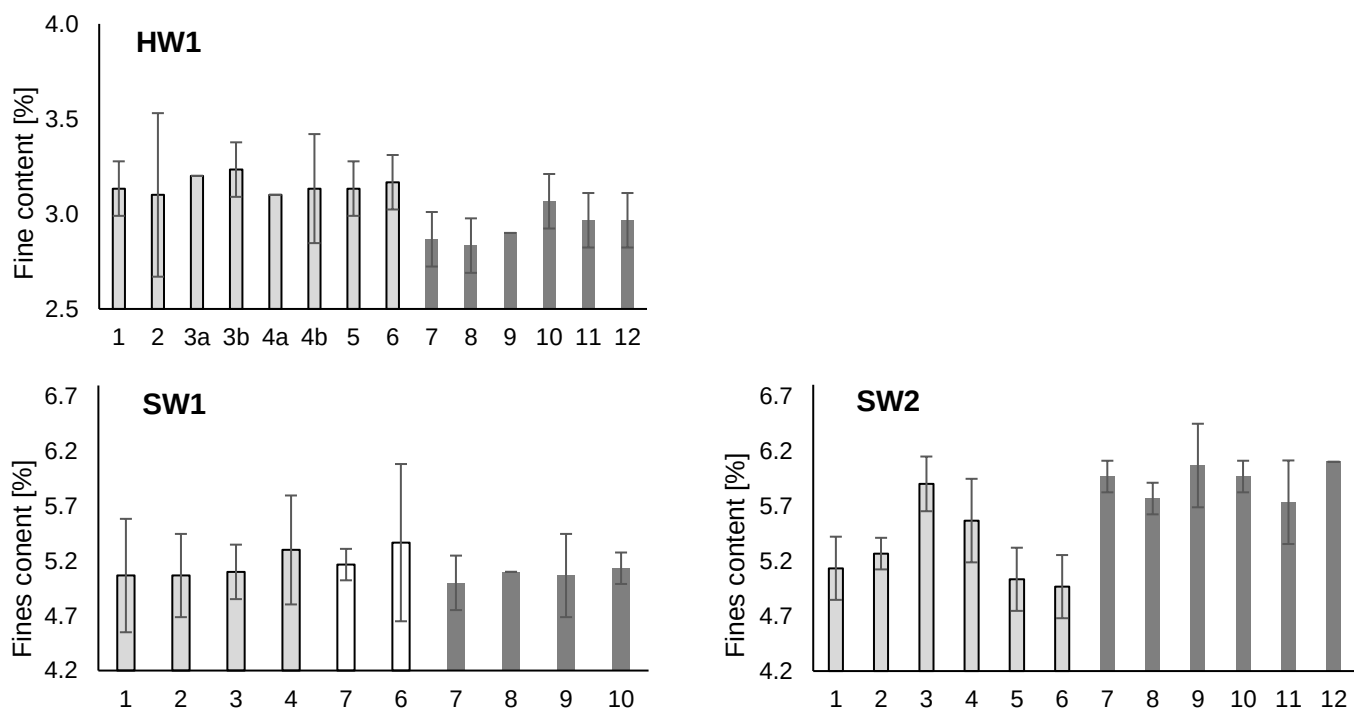


Figure 3 Mean fines content of pulps used to prepare the handsheets. The identifier in each graph indicates the handsheet series. For clarity, experiment points with medium curlation are marked using white bars with black border and points with high curlation with dark bar without border. The error bars indicate 95 % confidence value based on 3 measurements.

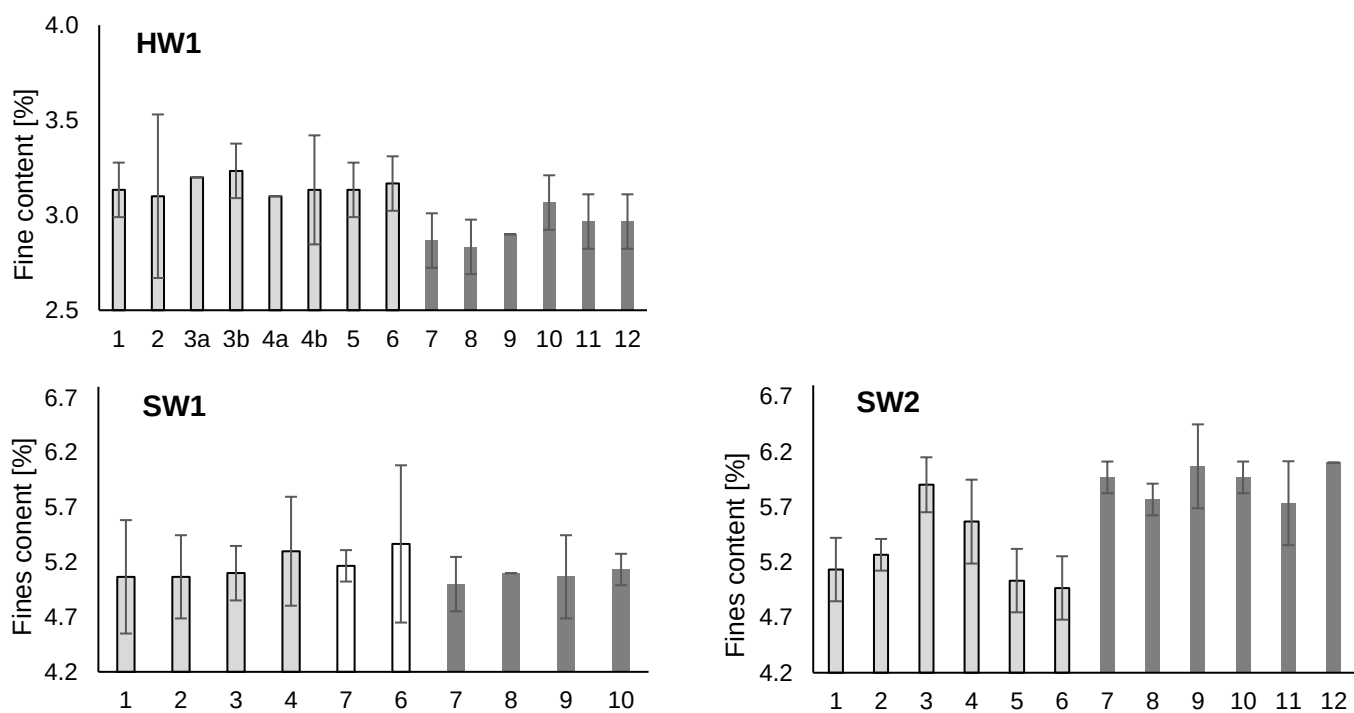


Figure 4 Mean fines content of pulps used to prepare the handsheets. The identifier in each graph indicates the handsheet series. For clarity, experiment points with medium curlation are marked using white

bars with black border and points with high curlation with dark bar without border. The error bars indicate 95 % confidence value based on 3 measurements.

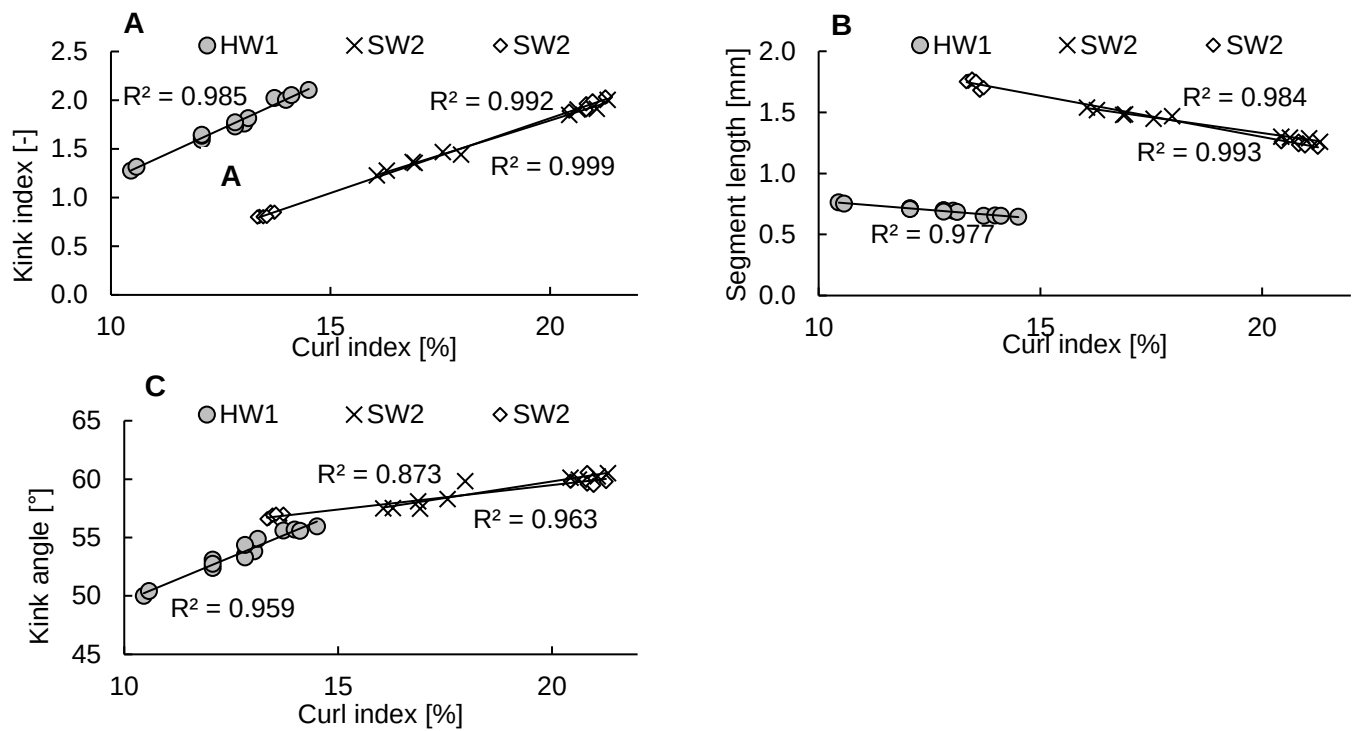


Figure 5 Mean kink index vs. curl index (A), mean segment length vs. curl index (B) and mean kink angle vs. curl index (C) and the R^2 for the different series.