Waste Newspapers Can Be Fiber Source for Corrugating Medium

The evaluation of corrugating medium made from recycled newspapers indicates that newspapers can be a potential source of fiber for corrugating medium.

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Interest increases in using wood fiber from various sources; thus, the possibility of producing corrugating medium from old newspapers has been considered. As pointed out by Mohaupt and Koning **(1),** corrugating medium can be produced from the wood fiber that has been separated from household trash.

However, separation of this fiber requires significant mounts of energy and capital equipment, so fiber from household trash will probably find a more economic use as fuel for energy.

Old newspapers successfully collected in a separated form in many communities throughout the U.S., in contrast to household trash. are a relatively clean source of recycled fiber.

They minimize the problems with thermo-plastic and other contaminants frequently encountered with other wastepaper stocks.

Newspapers to corrugating medium

Corrugating medium from 100% old newspapers was successfully fluted up to 525 fpm without cracking on the singlefacer, and was successfully bonded at 400 fpm with starch adhesive to a commercial kraft linerboard.

As expected, the medium was low in flat crush resistance - approximately 15.5 lb/in.^{2} for A-flute, singlefaced material. Adding 35% newspaper fiber to an NSSC (neutral sulfite semi-chemical) pulp and applying 2½% starch at the size press resulted in a medium that could be fluted at 600 fpm without cracking. Based on visual observation a satisfactory bond was achieved. The single-faced board had 2 flat crush resistance of 25.7 lb/in.^{2}. The propertier of the medium are given in Table I.

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Pulping procedure

Newspapers were slushed in a Hydrapulper with water at 130° F. The pulp was not refined or given a chemical treatment. Two nominal 26-lb/1,000 ft^2 corrugating mediums were made on a 13-inch-wide experimental fourdrinier paper machine, one from 100% newspaper pulp, the other from a blend of 35% newspaper pulp and 65% commercial hardwood NSSC pulp.

No difficulty was encountered with drainage on the wire of the experimental paper machine. However, at the speeds run on commercial machines, drainage could be a problem. It is also recognized that some paper machines require the addition of some long fiber to the-furnish to hold the sheet together during its passage through the wet end.

However, substitution of newspaper pulp for the long fiber was not considered in this study. For the blended pulp, the paper was surface-sized at a size press using a commercial cornstarch with a pickup of approximately 2.5%.

The media were single-faced on a 20-inch-wide experimental corrugator at 400 fpm using a commercial starch adhesive to bond the medium to a commercial 42-lb linerboard. The runnability, in terms of fracturing, was determined by fluting the material at increasing speeds up to 600 fpm, and then increasing the web tension while running at 600 fpm.

The medium from the blend of pulps was run at 600 fpm with 0.8 pound per inch of width (piw) tension applied to the web before cracking was induced. The all-newspaper medium was successfully run at 525 fpm with 0.6 piw tension.

Conclusions

The evaluation of corrugating medium made from recycled newspapers indicates that newspaper can be a potential source of fiber for corrugating medium. Blending .35% newspaper fiber with mixed hardwood NSSC pulp and adding 2½% starch resulted in a corrugating medium that was approximtely equal in strength except for tensile properties, with a commercial NSSC corrugating medium.

The medium showed satisfactory performance on an experimental singlefacer in terms of runnability and bonding. Flat crush resistance of the A-flute, single-faced material was approximately 26 lb/in.^{2}.

References

1. Mohaupt, A. A., and J. W. Koning, Jr. 1974. *Tappi 57*(11):56-58.

TABLE I—PROPERTIES OF CORRUGATING MEDIUMS PRODUCED FROM RECYCLED NEWSPAPERS

Mediums	Freeness,[a] ml	Thickness, mils	Concora medium test, lb	Water[b] absorbancy, s	Burst, pt	Tear, g	Folds, double	Ring crush, lb	TENSILE[c] Maximum strength, lb/in.^{2}	TENSILE[c] Modulus of elasticity 1,000 lb/in.^{2}	TENSILE[c] Strain to failure, pct	A-flute flat crush, lb/in.^{2}
Commercial NSSC	410	10.1	65	12	[illegible]	—	—	—	—	—	—	27.4
Machine	—	—	—	—	—	70	7	62	5,920	768	1.57	—
Cross machine	—	—	—	—	—	75	8	51	3,240	374	2.80	—
100 % Newspapers	180	11.1	35	56	28	—	—	—	—	—	—	15.5
Machine	—	—	—	—	—	71	6	52	3,540	427	1.34	—
Cross machine	—	—	—	—	—	85	3	36	1,540	171	2.37	—
35% Newspapers + 65% NSSC (2.5% starch)	410	10.2	56	219	41	—	—	—	—	—	—	25.7
Machine	—	—	—	—	—	64	7	63	4,960	573	1.43	—
Cross machine	—	—	—	—	—	82	4	46	2,150	231	2.87	—

[a]Canadian Standard Freeness. [b]0.1 ml water.
[c]Values based on thickness measurements made using Forest Products Laboratory stylus method.