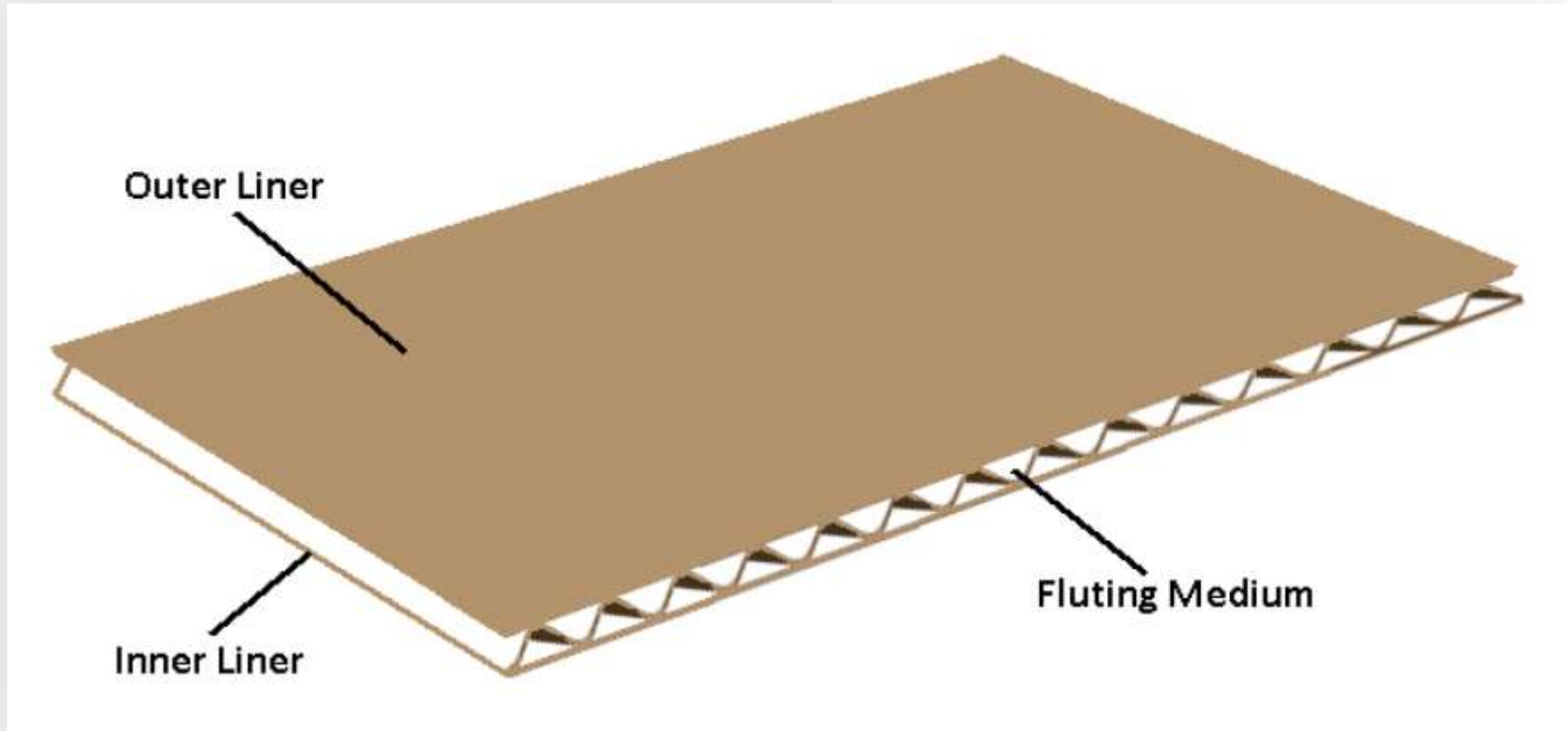




Role of fluting media & why it is different from liner

————— ■ by Pankaj Shah



15

SLIDES

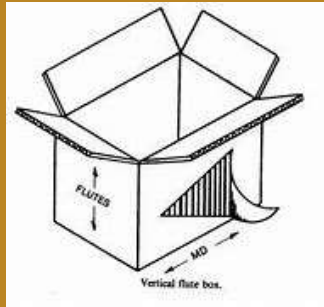
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ROLES OF FLUTING MEDIA

4

REASONS WHY FLUTING IS DIFFERENT FROM LINER

Role of fluting media

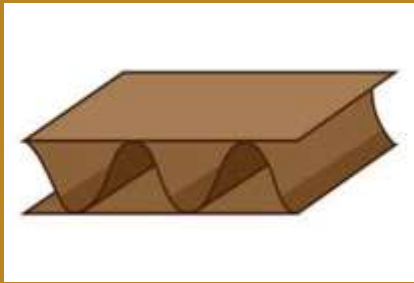


Column size
determines
strength

One reason corrugated is so strong is that the fluted medium separates the Two liners and when stood on end, the flutes act as columns. We know that Large dia column of concrete is stronger than small dia concrete column. So, the further apart the two liners can be held by the mediums, the stronger The corrugated structure will be. Hence, max caliper

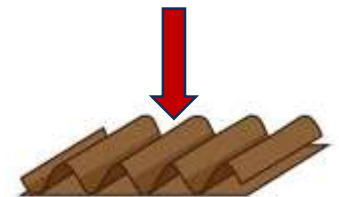
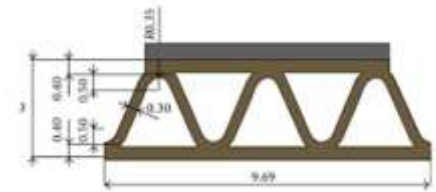


Role of fluting media



Fluting media
Needs stiffness
To maintain its
Shape & size

The Concora Corrugating Medium Test measures the crushing resistance of a laboratory fluted strip of corrugating medium, in Machine Direction, and provides a means of estimating the potential flat crush resistance of a corrugated board.

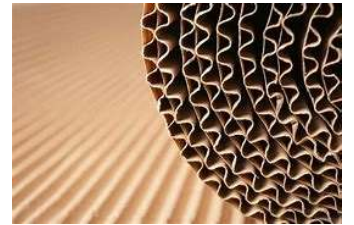


ROLE TWO – Resist “CRUSHING” forces So, the caliper is maintained

Role of fluting media

Fluting should be easily “pliable” during flute formation but stiff thereafter.

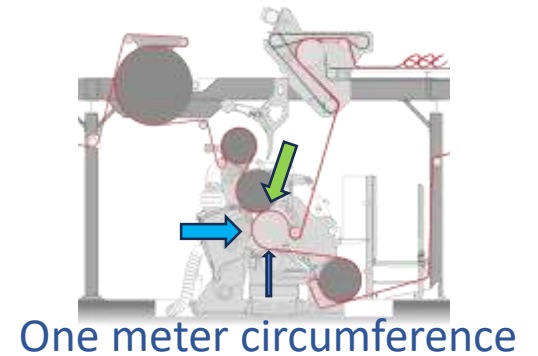
Fluting paper, temp & moisture adjusted, enters set of corrugated rolls and it is stressed into “flute formation” at high speed of ~ 250 mtrs/min Once flutes are formed, fluting media is expected to be stiff enough to resist deformation.



Role of fluting media

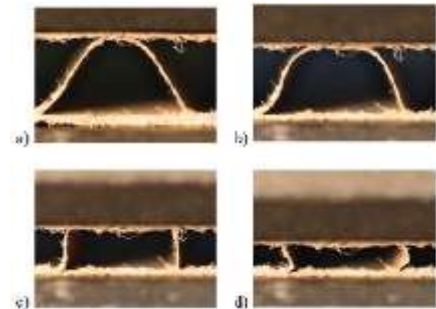
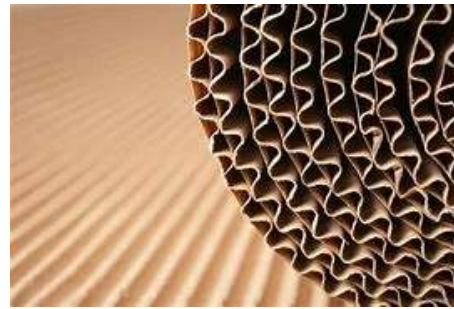
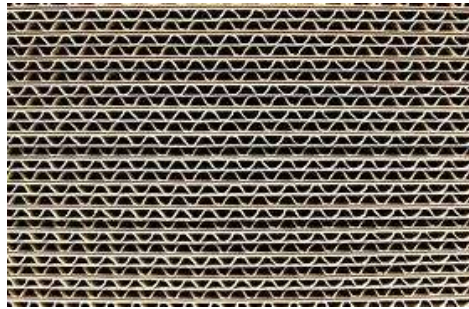
Since fluting medium gets “adhesive bonded” on both Sides, it should have ability To absorb water-based Adhesive at machine speed

- Corrugated roll dia typically 300mm – 400mm
- And circumference is about 1000 mm OR 1 mtr
- Distance between adhesive pick up and bonding with liner is Approx 25% of circumference = 0.25 mtr
- Machine has increased to > 250 mtr/min
- So, the time available is $0.25/250 \times 60 = <0.1$ sec



Role of fluting media

Summary

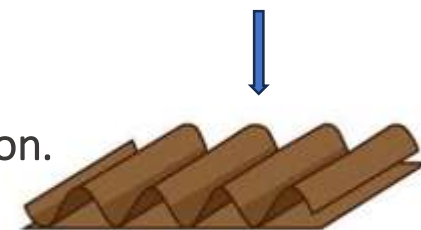
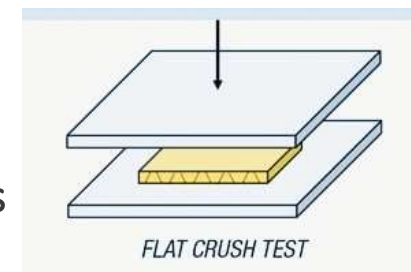


- Keep liners apart
- Easily “pliable” during flute formation
- Resist “CRUSHING” forces So, the caliper is maintained
- Absorb liquid adhesive at corrugating speed.....time available < 0.1 second

Why fluting media is different from liner

Fluting media
needs
stiffness to
maintain its
shape & size

- Relevant test is “Concora Medium Test” or CMT, And for corrugated boards, it is Flat Crush Test or FCT.
- The concora medium test measures the crushing resistance of a laboratory fluted strip of corrugating medium, and provides a means of estimating the potential flat crush Resistance of a corrugated boards. Both CMT & FCT measure in Machine Direction – MD.
- CMT is deemed to be a bit laborious so some prefer alternate tests such as RCT or SCT. Better surrogate test is SCT-MD. Good correlation.
- But RCT or SCT are measuring Cross Direction - CD strength. So, its correlation with CMT is MD/CD ratio Dependent.



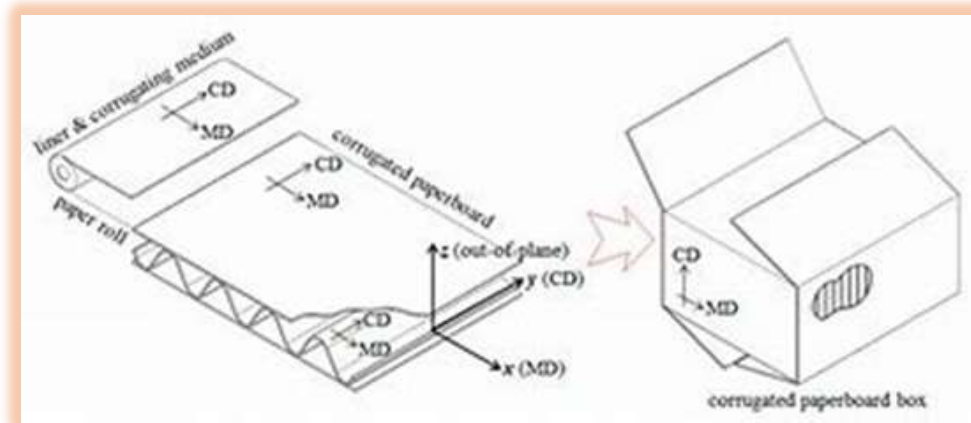
DIFFERENCE ONE – Strength measurement for fluting media is CMT and for corrugated boards is FCT. Both in MD.

Why fluting media is different from liner

CMT measures in MD direction.

MD vs CD

RCT & SCT measure in CD direction.



Why fluting media is different from liner

Bursting strength is not relevant

- In USA, such self certification is printed on every box. Let's take an example. BS = 200 pounds/sq. inch
- This is equivalent to 14 kg/cm²
- It also states both liners must be of 42 + 42 lbs/MSF basis weight.
- This equates to 205 + 205 gsm.
- USA liners have standardized BF of 35.
- So, the BS calculation is 205 gsm x 35 BF x 2 liners = 14.35 kg/cm²



DIFFERENCE TWO - Fluting media is not expected to contribute to BS

Why fluting media is different from liner

Fluting medium gets “adhesive bonded” on both sides. It should have ability to absorb water based adhesive at machine speed

- As stated earlier, the time available is <0.1 second.
- So fluting media requires higher Cobb.
- Liner receives ink on top side and adhesive on back side.
- Printing speed is less than corrugating speed. Hence, different Cobb for liner and fluting has a logical justification.



DIFFERENCE THREE – Cobb for liner & medium needs not be same.

Why fluting media is different from liner

Fluting
media is
generally
not printed

- Fluting media does not need uniform printable surface or a particular shade – since it is not printed
- Since “fluting” process is now done on vacuum held corrugating rolls, permeability is relevant.



DIFFERENCE FOUR – Fluting media does **NOT** need a particular shade
Or uniform printable surface. But it needs Certain permeability.

Why fluting media is different from liner

Summary

1. Strength measurement for fluting media is CMT, and for boards, it is FCT. Both are MD measurement.
Alternate RCT or SCT are CD measurements.
2. Fluting media is NOT expected to contribute to Bursting Strength of the corrugated board
3. Cobb for liner & medium need NOT be the same
4. Fluting media does NOT need a particular shade or uniform printable surface. But it needs certain permeability

Role of fluting media & why it is different from liner

Conclusion

- Fluting medium needs to be 'pliable', 'stiff', 'adhesive bondable', 'crush resistant in machine direction' at speed of 250+ meters/minute.
- Liner needs to be 'uniform printable', 'aesthetic', 'crush resistant in cross direction', 'rupture resistant' and 'odour free' at speed of 100+ meters/minute
- Liner and fluting media are functionally different grades.

Quotes

- Liner used as fluting medium does not corrugate well. Consequently, gives a relatively low flat crush (soft board)
- In the United States, all regular grade commercial corrugating medium has about the same flat crush.

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Thank You!

