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HOW STRONGER, CRUSH-RESISTANT BOXES CAN SAVE COSTS AND REDUCE WASTE

When assembling corrugated sheets, two pieces of thick paperboard are glued together with a corrugated flute in the middle. Oftentimes, downline converting process smashes the flutes, weakening the box. Alpha Packaging, Inc. has two QS Ultimas by EMBA state-of-the-art machines.

The Emba 245 QS Ultima can convert a blank size up to 55" x 96". The brand new Emba 175 QS Ultima is a mini machine capable of running smaller e-commerce boxes like a 4" x 4" x 4", or a minimum width panel of 3 9/16".

They can prevent the flute from getting crushed, thus creating sturdier, more environmentally friendly boxes.

THE PROBLEM WITH WEAKENED BOXES

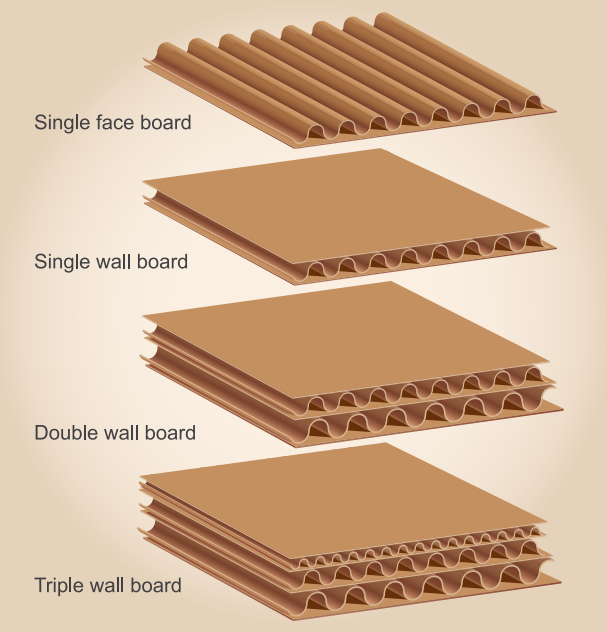
Modern warehouses typically accommodate stack heights of 15 to 20 feet. Operators often stack pallet loads up to four units high, each containing corrugated boxes packed with products. These corrugated boxes must be able to support the substantial weight of these stacks.

An important physical property of corrugated boxes has always been the stacking strength. Approximately 40-60% of corrugated boxes manufactured in the U.S. are compression-sensitive.

STACKING STRENGTH SPECIFICATIONS

About 15-20% of all boxes are hard-core compression sensitive to meet the compression specifications required and enforced by the box customer. Often, customers specify the need for boxes made with high-performance linerboard or request a board grade. These added specifications and tests can make the total cost of the boxes higher than that specified by Rule 41.

Most linerboard suppliers are providing high-stacking strength linerboard to converting companies or for their own box plants. Some linerboard mills are even producing regular linerboard grades with ring crush specifications.



IMPACT

Eliminating box crushing can reduce costs while still satisfying the warehouse stacking and box compression needs of the box user. The added expense of crushing flutes during the converting process is high, so the key to lowering spending is to eliminate the risk of crushing in converting operations. As box makers identify the cause of crushing and other fabrication and corrugation defects, they can profit by working to eliminate the cause.

Now more than ever, box compression strength is becoming increasingly important in the marketplace. The converter that can manufacture low-cost compression-sensitive boxes will outlast the competition in the long run.

Rightsizing your liner combination has a savings potential when you do not crush the box during the production of that carton. So, you can look at lower linerboards and mediums to reduce cost without sacrificing Edge Crush Test.

MEASURING CRUSHING

Research has repeatedly shown that boxes constructed using crushed corrugated boards do not perform as well as boxes made using uncrushed boards.

MD TORSIONAL STIFFNESS (MDTS)

Crushing corrugated boards lowers their machine direction torsional stiffness (MDTS), the most sensitive structural characteristic of corrugated cardboards. Failure of MDTS can lead to bending stiffness failure, causing box bulging, which results in compression failure and, eventually, box collapse.

BOX CRUSH TEST (BCT)

In the Sept 2007 Appita Journal, findings revealed that board crush not only adversely affects box crush text (BCT) results but can also have a far more dramatic impact on overall performance in the service environment, as shown by tests subjecting boxes to constant compression with cyclic humidity conditions.

Over the years, research has proven that uncrushed boards provide the highest BCT level that the equipment and components are capable of. Improving the manufactured quality of boxes is possible by taking the following actions:

1. Eliminating crush during conversion
2. Optimizing the corrugator processes to build a stronger board

BCT testing often incurs problems in its implementations, the most significant being the considerable standard deviation of the results and the resources and time needed to minimize this figure. Boxes must be preconditioned at approximately 30% relative humidity (RH) and then conditioned to 50% RH. The process takes considerable time and space and can only occur in conditioned laboratories. It is unsuitable for online QC as boxes are usually gone before obtaining adequate results.

DYNAMIC STIFFNESS TESTING (DST)

On the contrary, dynamic stiffness testing (DST) is quick and reliable, guaranteeing that any box with a well-made design not crushed as measured by the DST will have a maximized BCT level.

BCT SENSITIVITY

BCT is not as sensitive to crush as cyclic humidity performance since all cellulose fiber products experience creep under tension or compression. This time-dependent property will only worsen when exposing the corrugated boxes to cyclic humidity. Structural damage to the board by crushing can significantly speed up the creep process.

BCT, however, is a short-term test with minimal creep component. The faster the BCT test, the stronger the box will seem to be. Long-term stacking tests that utilize deadweights in a controlled environment will show reduced results compared to the BCT due to the creep effect.

ALPHA PACKAGING'S OFFERINGS

At Alpha Packaging, we operate the EMBA Platform, the world's first non-crush converting machines. The Magna VSC Slotter offers vacuum transport, and the Ultima Feeder™ has no nip rolls, making non-crush converting a reality.

The corrugated board retains its strength and properties, and the board thickness difference measured before and after the pre-crushing process was as follows:

- 0% for the 9% pre-crushed samples
- 5% for the 35% pre-crushed samples

These measurements show that thickness is not an effective damage evaluation tool. However, the flat crush hardness value is extremely sensitive to pre-crushing. For a 9% pre-crushed sample, the hardness value decreases by 16%, and for a 35% sample, hardness is unchanged.

EMBA ULTIMA TECHNOLOGY

EMBA is an integrated company that conducts box strength tests of EMBA non-crush boxes. The board is produced in one corrugator and transferred to three separate locations. Three converting machines can manufacture identical box types (350 x 350 x 400).

The boxes are tested and returned in the same laboratory in accordance with EUPS standards. The EMBA Ultima technology preserves maximum fluting strength with increased box strength, resulting in a higher BCT and improved box printability. Stronger, more durable boxes mean less waste, reducing box users' carbon footprint.

CONTACT ALPHA PACKAGING, INC. FOR STRONGER, NON-CRUSH BOXES

Founded in 1987, Alpha Packaging, Inc. is Arkansas' largest independently owned corrugated box manufacturing company. Our 200,000-square-foot manufacturing facility houses state-of-the-art machinery capable of creating virtually any style of corrugated box.

As a one-stop shop for corrugated boxes, Alpha Packaging, Inc. can create the ideal packaging solution for storing, shipping, and displaying your products. Drawing from over 200 years of combined experience, our expert team can create a solution tailored to meet the needs of your specific application. Utilizing the EMBA platform and cutting-edge Ultima technology allows us to provide crush-proof solutions so that your warehouse can maintain the stack heights needed to ensure cost-saving efficiency while storing and transporting boxes.

Our team will begin with a comprehensive consultation to better understand your needs and those of your products. Using your input, we can design and manufacture custom corrugated boxes that address all product challenges. We offer support and guidance throughout the entire process and are committed to superior customer service and on-time order fulfillment.

Contact us to learn how Alpha Packaging, Inc. can help design stronger boxes for your next project.

ABOUT US

Alpha Packaging, Inc. was founded in 1987 and is the largest independently owned corrugated box manufacturing company in Arkansas. At home in Greenwood, Arkansas our 200,000 square feet on 27 acres offers manufacturing, warehousing, and fulfillment for your packaging needs. Our manufacturing plant is equipped with state-of-the-art machinery, capable of creating virtually any style container, including triple wall and plastic corrugated boxes. Our 50,000-square-foot warehouse also offers complete fulfillment services.

The key to quality products and customer satisfaction is unlocked by our exceptional family of over 100 employees.

Our Sales Staff and Design Engineers with over 100 years of combined experience reach out to all areas within 300 miles. From our house to yours by our own fleet of trucks, driven by our professional Alpha drivers.

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