PACKAGING

Board grades for shelf-friendly packaging

*Ron Mines FAIP**

I recently participated in a training day at Woolworths Minchinbury DC, facilitated by IDG, the Australian Institute of Packaging (AIP) and Woolworths. The previous day, most of the trainees had attended one of Woolworths' supermarkets to see how shelf friendly packaging (SFP) was being used in their storeroom and with shelf loading. I was told there were many questions raised during the day about which board grade is best to use for outer boxes.

The paradox for Woolworths and other retailers is that the stores want stable outer packaging that is easy to handle, open and load to shelves, with waste outers/trays that are easy to deal with, while the DC wants a more robust, tough and durable pack that can withstand rough manual handling and automatic order picking as well as the rigours of the carousel that delivers the outers to the store roller conveyors, plus the variable pallet load stacking that can add all sorts of dynamic loads to the pack.

It is also not my intention to touch on the additional costs for suppliers to the grocery industry. These have been well explained previously. So, back to the question about the best board grade.

Ultimately, every packing exercise is unique and requires considerable understanding of pack configuration and packing method. Every point in the supply chain, from the box maker to the transport company delivering finished product to the DC, has the potential to cause the SFP to fail, particularly with outers that are perforated for easy opening.

So, let's just deal with perforated boxes, which generally come in RSC or wraparound variants. The supermarket industry wants a single facing of the product on the shelf. This means that in most cases, the box design will end up with perforations across the narrow front of the box, then the perforations will continue at an angle towards the back of the box in one form or another, then across the back.

Typically, in a compression stack, column stacked boxes with perforations as described above with no other dynamic forces applied (side or end shock typically from conveyor stops or movement on the truck when braking, to name but a very few of the risks) will reduce the top to bottom compression strength by around 40% from the original pack.

Allowing for other issues such as too much die cutting pressure by the box maker, damage occurring when erecting and packing, poor palletising and rough handling in the DC, where does the packaging technologist set the safety factor?

To illustrate this, I have run an exercise on a soft pouch 12 pack where each pouch weighs 500 g and the box weighs 200 g.

Figure 1: This pack weighs 6.2 kg, stacked five high so the weight on the bottom box is 25 kg (no safety factors allocated). As a two pallet high stack, the net weight on the bottom box is 55 kg.

Figure 2: The safety factor when this job was an unperforated RSC was fairly high because the pouches that are packed are non-supporting in the pack. Let's say a safety factor of 4.5 for one pallet high and 6.8 for two pallets high is chosen, which

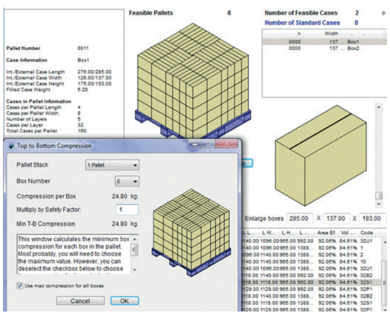

Figure 1.

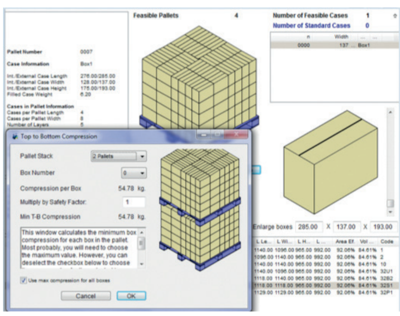

Figure 2.

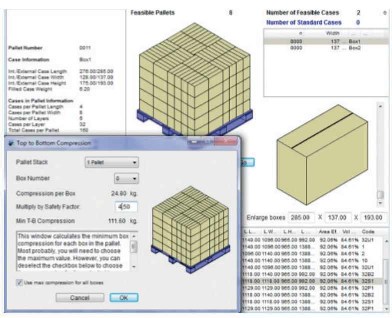

Figure 3.

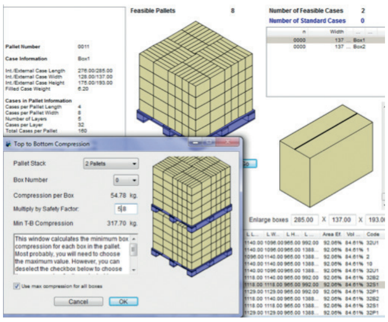

Figure 4.

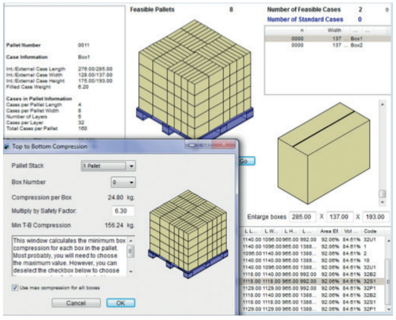

Figure 5.

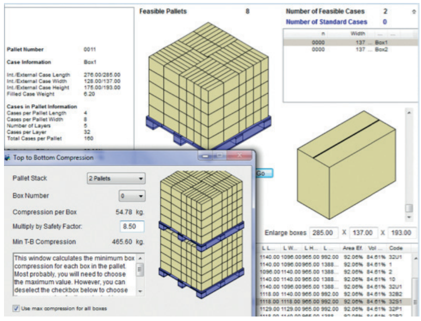

Figure 6.

was established to cover all of the rigours that the box must withstand from the time it is fed onto the packing machine, until it reaches the supermarket shelf.

Figure 3: At one pallet high, the value for the weight on the bottom box is 112 kg. As a two-pallet-high stack, the value for the weight on the bottom box is 318 kg.

Figure 4: The next step is to determine what safety factor should be applied with all of the new factors of making and handling a perforated box.

So for this type of pack, which is not refrigerated, a packaging technologist would arrive at a safety factor of 6.3 for one pallet high.

Figure 5: Now the value for the weight on the bottom box is 156 kg. Then a safety factor of 8.5 for two pallets high is determined.

Figure 6: The value of the net weight on the bottom box is now 466 kg.

So now that's established, add 40% to the box strength required to establish the approximate theoretical carrying capacity of the boxes required to get the product safely onto the store shelves.

So why was it necessary to add 40% when the safety factor has already been adjusted? These increases in the safety factor only account for the added potential for failure. The increase in strength is still required to compensate for the direct loss in top-to-bottom compression strength.

The top-to-bottom compression strength now required for one pallet high is 218 kg and for two pallets high is 652 kg.

Now the packaging technologist can go to their box maker and have them determine the best board grade for the pack. This should then be a process of determining the most suitable flute type, then board combination to achieve the required top-to-bottom compression strength.

Then through trialling and assessing, a measure of confidence can be established, allowing for all of the potentials that have been built into the safety factor.

For more information, contact educate@aipack.com.au

Ron Mines FAIP, known as the Boxologist, is a consultant to the box and packaging industry. He has 40+ plus years of experience and close involvement in the industry. He runs specialised training programs for box makers and box users, as well as providing technical and other support throughout the industry.

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