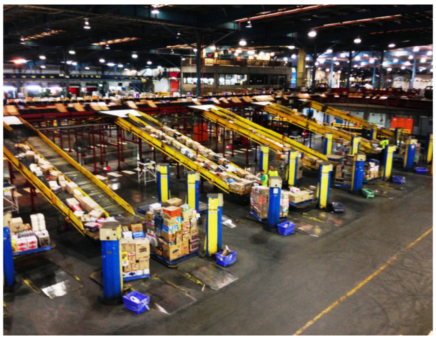
Last month I participated in a training day at Woolworths Minchinbury DC, facilitated by IDG, AIP and Woolworths. The previous day, most of the trainees had attended one of Woolworths' supermarkets to see how Shelf Friendly Packaging was being used in their storeroom and with shelf loading.

I was told there were many questions raised during the day about what the best board grade is, to use for outer boxes.

The paradox for Woolworths and other retailers is that the stores want stable but easy to handle outer packaging that is easy to handle, open and load to shelves, then easy to deal with the waste outers / trays, 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 their carousel that delivers the outers to the store roller conveyors, then survive variable pallet load stacking that can add all sorts of dynamic loads to the pack.



Over the past 3 issues of PKN, my AIP colleagues have written eloquently about the good, the bad and the ugly of SFP / SRP / RRP and I don't intend to compete with their knowledge here. It is also not my intention to touch on the additional costs for suppliers to the grocery industry. These have been well explained previously.

OK, back to the question about the best board grade.

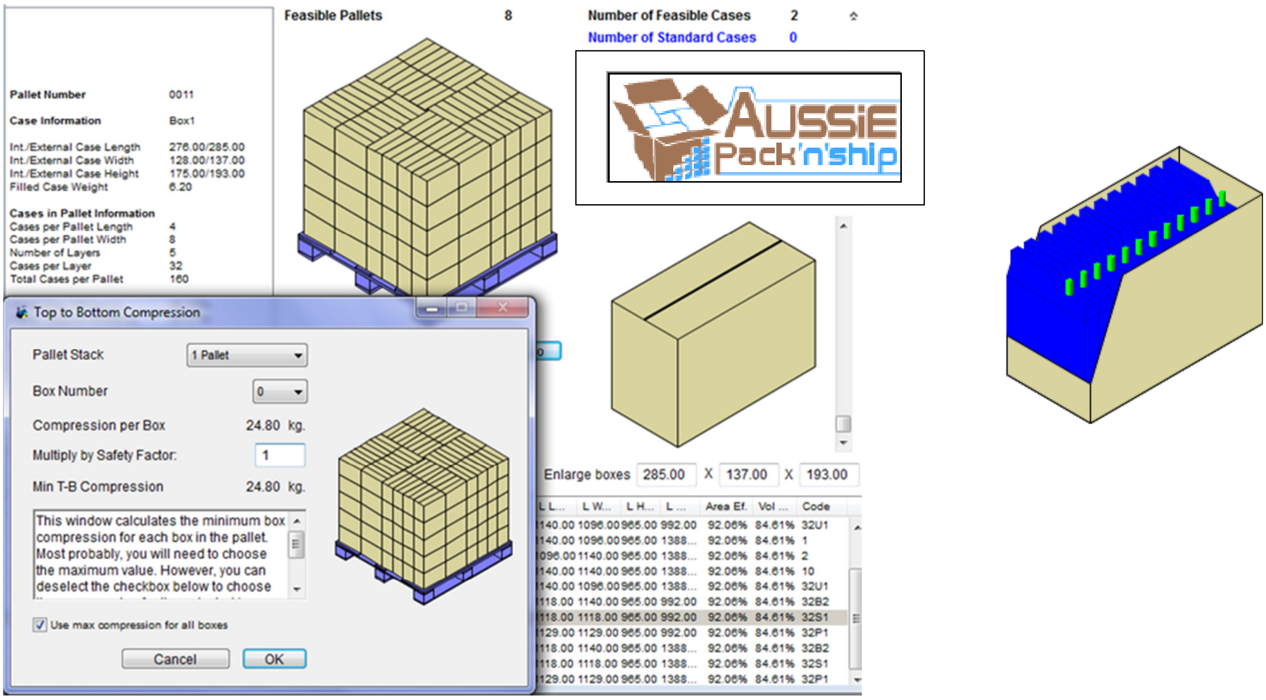
Ultimately, every packing exercise is unique and requires considerable understanding of pack configuration and packing method. Anywhere in the supply chain, from the box maker to the transport company delivering finished product to the DC, has the singular potential to cause the SFP to fail, particularly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

So, let's just deal with perforated boxes, which come in RSC or Wrap Around variants mostly. 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 perfs 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 perfs 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.

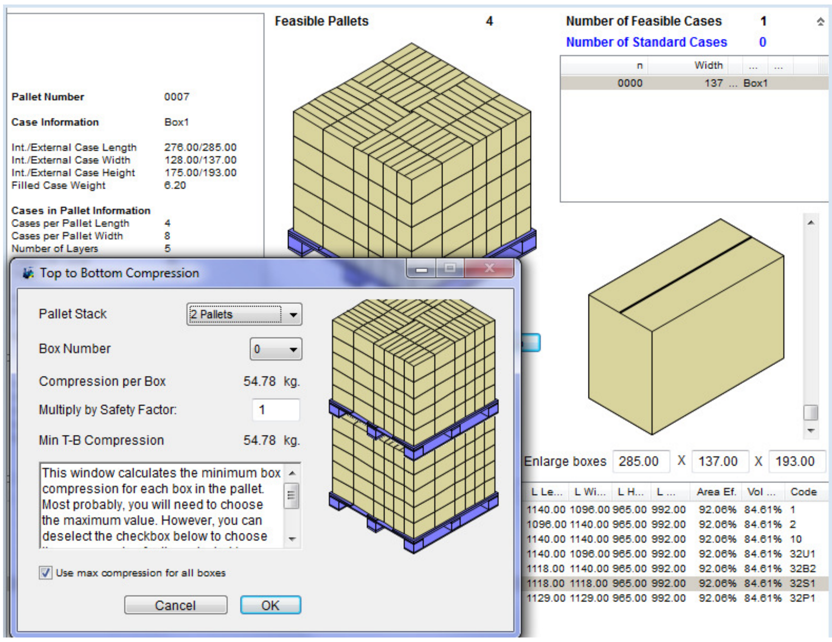
Allowing for other issues including too much die cutting pressure by the boxmaker, damage occurring when erecting and packing, poor palletising and rough handling in the DC, where does the Packaging Technologist set the safety factor?

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



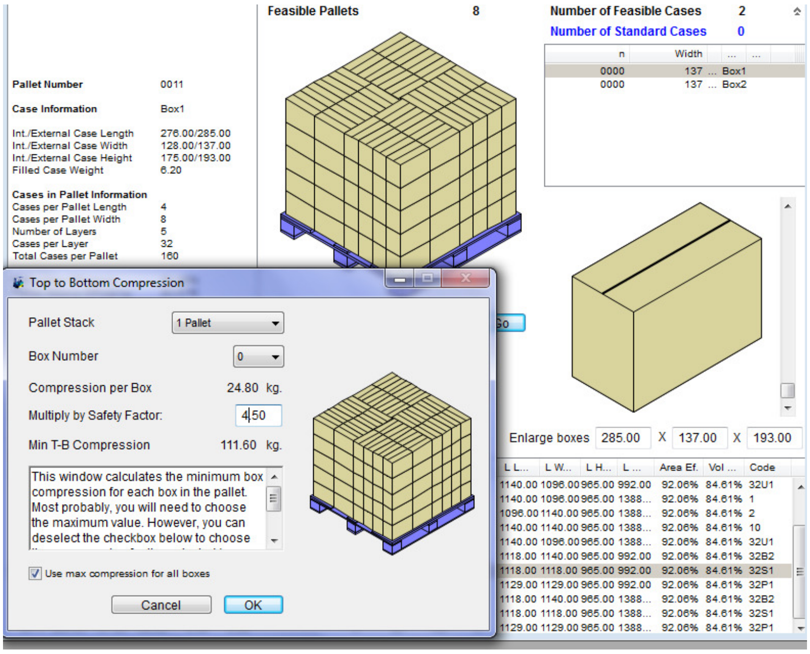
This pack weighs 6.2kg, stacked 5 high so the weight on the bottom box is 25kg (no Safety Factors allocated).

As a 2 pallet high stack, the net weight on the bottom box is 55kg



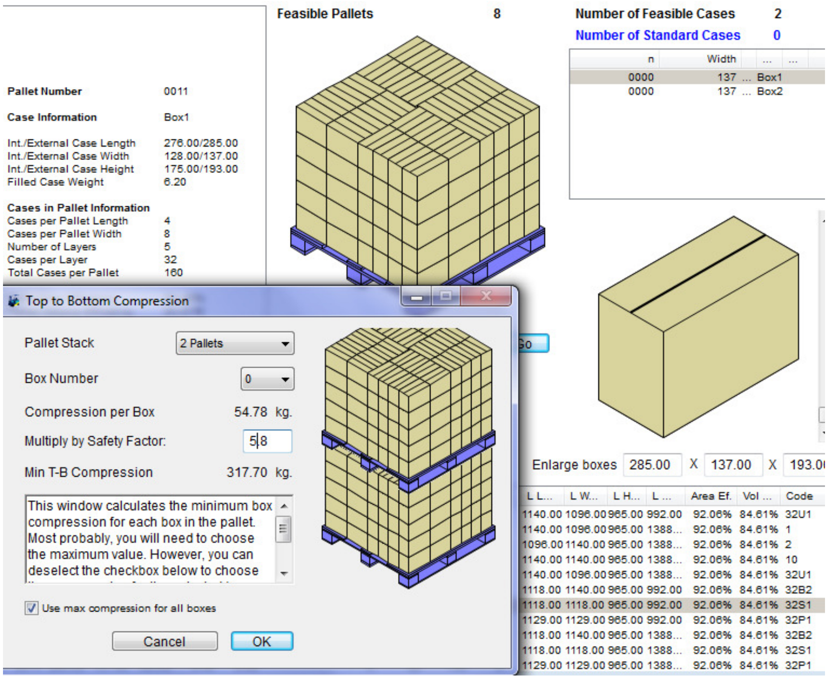
Your Safety Factor when this job was an un-perforated RSC was fairly high because the pouches that you pack are non-supporting in the pack. You chose 4.5 for 1 pallet high and

6.8 for 2 pallets high, which you established to cover all of the rigours that the box must withstand between the time you feed it onto your packing machine, till it reaches the supermarket shelf.



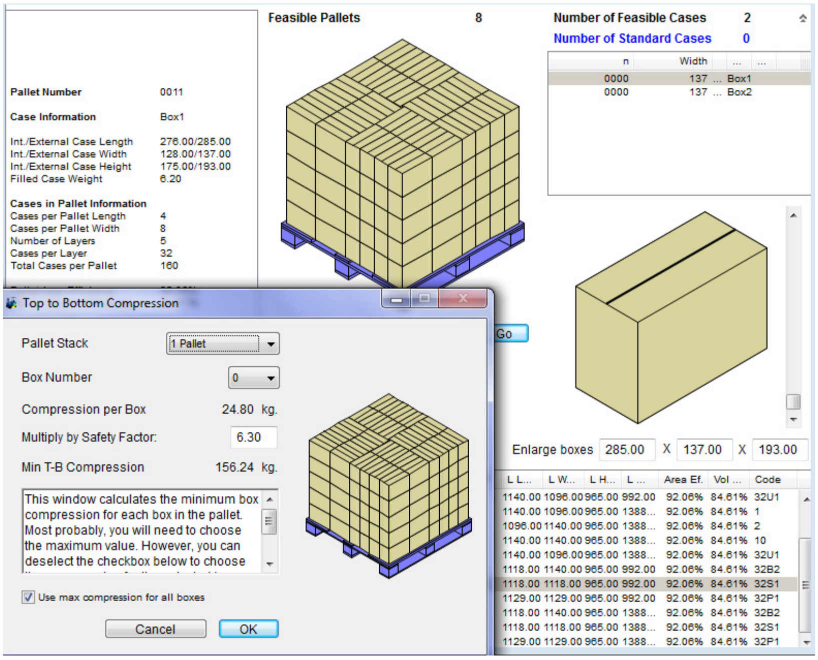
So at 1 pallet high, the value for the weight on the bottom box is 112kg

As a 2 pallet high stack, the value for the weight on the bottom box is 318kg



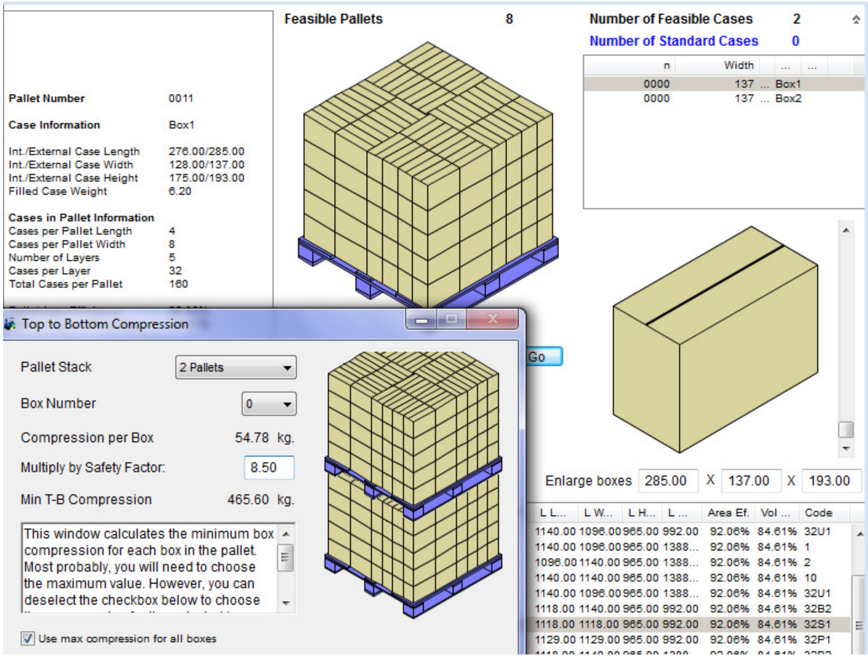
The next step is to determine what Safety Factor you will apply with all of the new factors of making and handling a perforated box.

So for this type of pack, which is not refrigerated, you arrive at a Safety Factor of 6.3 for 1 pallet high.



Now the value for the weight on the bottom box is 156kg

Then you determine a Safety Factor of 8.5 for 2 pallets high



The value of the net weight on the bottom box is now 466kg

Great, 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 your product safely onto the store shelves.

So why was it necessary to add 40% when you have already adjusted the Safety Factor? 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 1 pallet high is 218kg and for 2 pallets high is 652kg.

Now you can go to your boxmaker and have them determine the best board grade for your 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 you have built into your safety factor.