

# Processing end-of-life coated paper products for use as structural materials

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An estimated **1 billion** single-use coffee cups are discarded in Australia each year. We are developing structural materials utilising this waste, as well as other coated paper products such as beverage cartons and waxed cardboard boxes.

## Single-use coffee cups in Australia

Coated paper products are commonplace in food and beverage packaging, such as single-use coffee cups, however the use of a polymeric or wax coating prevents them from being recycled with the general paper stream. The cups are therefore almost universally sent to landfill.

So far, only two Australian states (South Australia and Western Australia) have taken steps toward banning single-use coffee cups. SA has announced an intention to ban but has not outlined how the transition is expected to take place, while WA has announced that compostable products will still be allowed. Even so, compostable plastics require extra infrastructure to be able to be processed, and remain a single-use product.

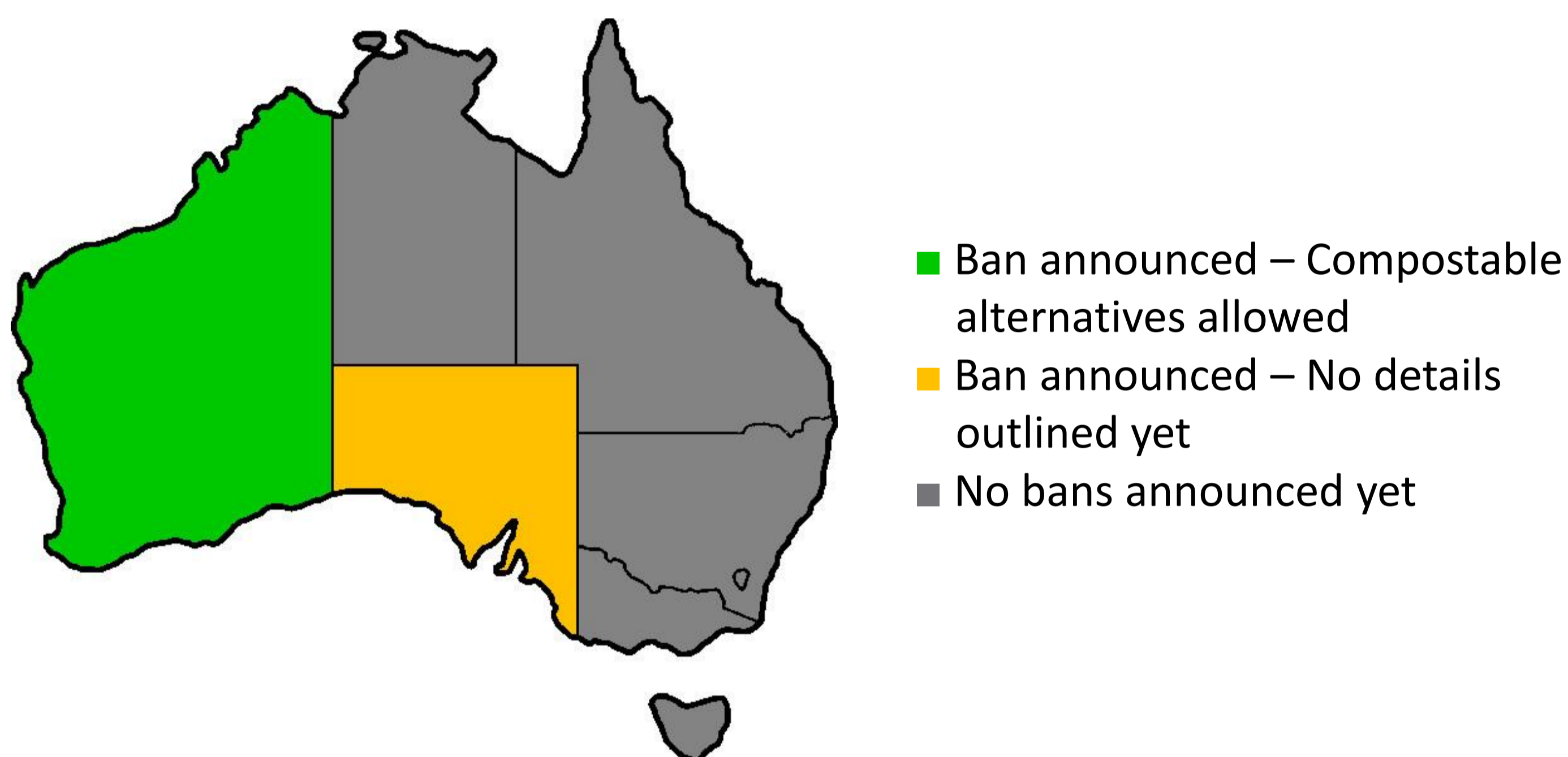


Figure 1: Action taken by Australian states on single-use coffee cups.

Until the whole country transitions away from using disposable cups, there is a need for a way to utilise the materials and divert them from landfill. As one of the research activities at the NO WASTE pilot precinct, we have been developing simple methods to process this waste, which can be implemented at a small scale for use in regional areas as well as in cities.

As part of this research we have created panels and boards made from single-use paper cups, either by shredding the cups and pressing into panels, or stacking the cups and pressing into boards.



Figure 2: A panel and two boards made from pressing shredded and stacked paper cups, respectively.

## From paper cups to building materials

We used heat and pressure to bond the cups together into panels and boards, with the plastic coating acting as an adhesive. This means that no additives are required, and the products are inherently recyclable through the same process.

While stacking the cups presents an extra challenge in preparing post-consumer waste for processing, we could achieve significantly higher strength in the final product compared to the shredded cups. In either case, the mechanical strength achieved is comparable to commercial wood composite products, such as particleboard.

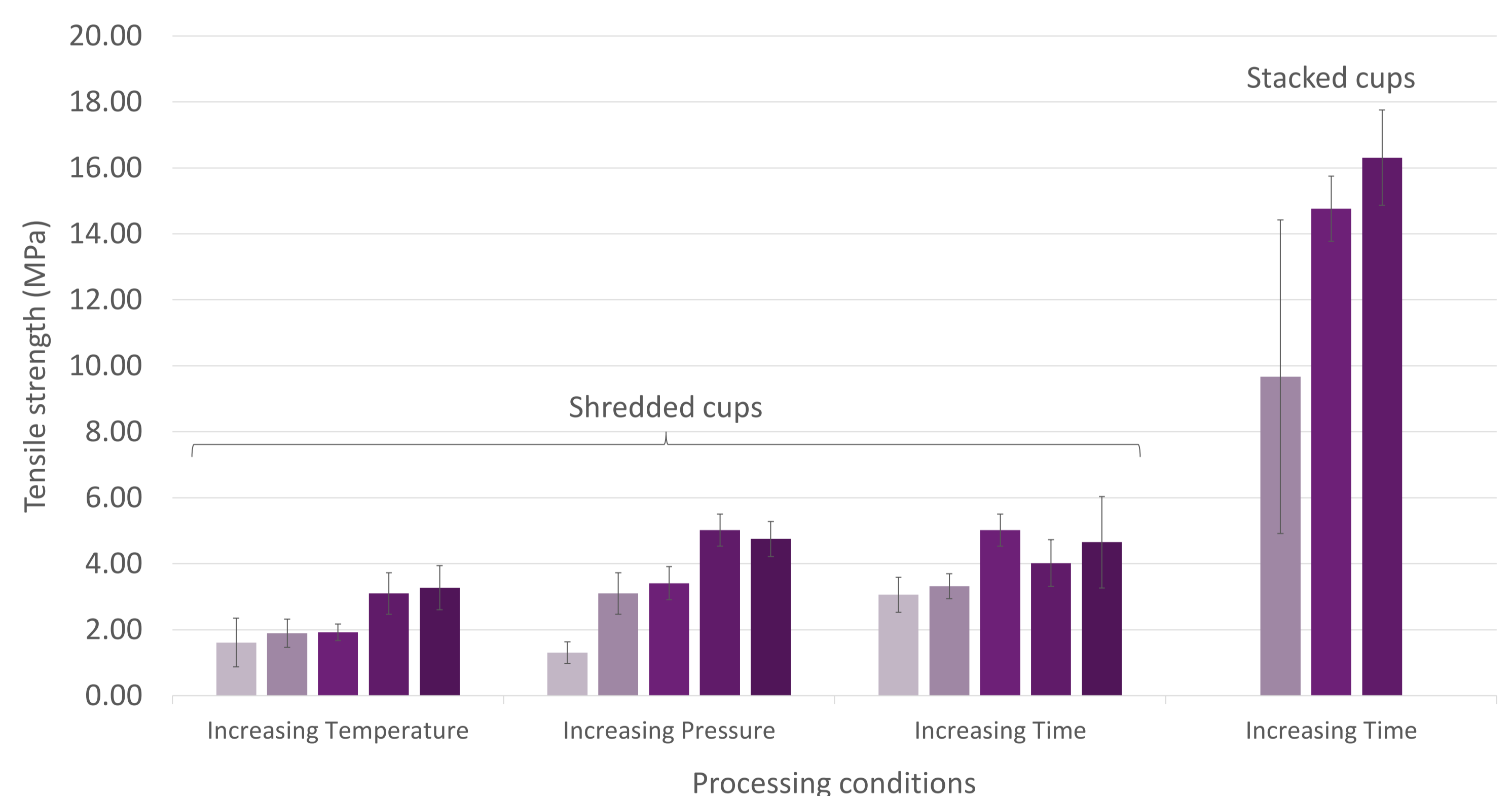


Figure 3: Tensile strengths of panels and boards made from pressed paper cups.

## What's next?

- We have established that stacked cups can produce 3x the strength of shredded cups, both are comparable to commercial wood composites.
- Translation of the understanding of the methods developed to other similar materials.
- We have promising preliminary results using waxed corrugated cardboard.
- Investigating how to optimise energy use and material volumes to reach a commercially viable product.



Figure 4: A panel made from post-consumer waxed corrugated cardboard.

### FOR FURTHER INFORMATION

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### REFERENCES/ACKNOWLEDGEMENTS

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