

Response to Reviewer 1 (Howard Conway)

The total number of tests is 163. We have fixed the number reported in the conclusion.

Section 2.4. We've added further explanation about the model and justification for only modeling PSTs (now Section 4). We've also added Appendix A, where we justify our linear elastic behavior assumption.

The profiles were not synthetic, but from field measurements. Dates corresponding to Figs 8 a, b, and c and which can be referenced in Table 1, have been added to the text (Section 4).

The elastic modulus was calculated for each layer. This was already stated in the text, but we've restated it in Appendix A. Given that we are modeling a change in total strain energy and assuming linear elasticity, the strain energy  $U$  for each element can be easily be calculated if one knows the volume  $V$ , the stress  $\sigma$  or the elastic modulus  $E$ , and the strain  $\varepsilon$  for each element:

$$U = \frac{1}{2} \int_V \sigma \varepsilon dV = \frac{1}{2} \int_V E \varepsilon^2 dV \quad (1)$$

Our understanding is that SENE does a similar calculation to Eq.1, thus we suggest SENE is and its ETABLE sum are appropriate for our linear elastic assumption and do not require further explanation.

Re: Different modeling results in Figs 9 and 10. see Appendix A.

p2 | 17 We'd like to leave this statement open, as we present no information on the accuracy of longer stability tests. Our recommendations for how ECT and PST guidelines should be changed are part of a current project where we examine the accuracy of longer tests at predicting stability.

p5 | 24 changed

p6 | 5 changed "stipulated" to "restricted" Also rewrote the following sentence.

changed width to "b" in all instances

p 6 | 19 changed

MATLAB reference provided

Section 2.4 - created a new Section (4) for finite element method and results

p 9 | 6 Rewritten

p 10 | 5 changed

3.2.1 The only spatial trend that we found – that collapse amplitudes were greatest at the ends – appeared independent of test length.

3.2.2 Yes, measurement error is possible, so we've added that to the list.

p 12 | 18 added CPSTs results to the abstract and conclusion

p 12 | 25 added further discussion about faceting in the slab during a cold snap in this time period .