

1 THE IN-PLANE STABILITY CHECKS IN BS 5950-1:2000

1.1 Checks for portal frames

Single-storey portal frames of economic proportions need to be checked to ensure that they have adequate in-plane stability, whether designed by elastic or plastic methods. This type of frame cannot be checked by the simple methods for multi-storey frames in BS 5950-1^[1] Clauses 2.4.2.6 and 2.4.2.7 because axial compression in the rafter is not considered in that method. The structural phenomena involved in in-plane stability of single-storey frames are described in Section 2 together with a comparison with multi-storey frames.

BS 5950-1:2000 gives three methods for checking the in-plane stability of single-storey frames:

- The Sway-check method
- The Amplified Moment method
- Second-order analysis

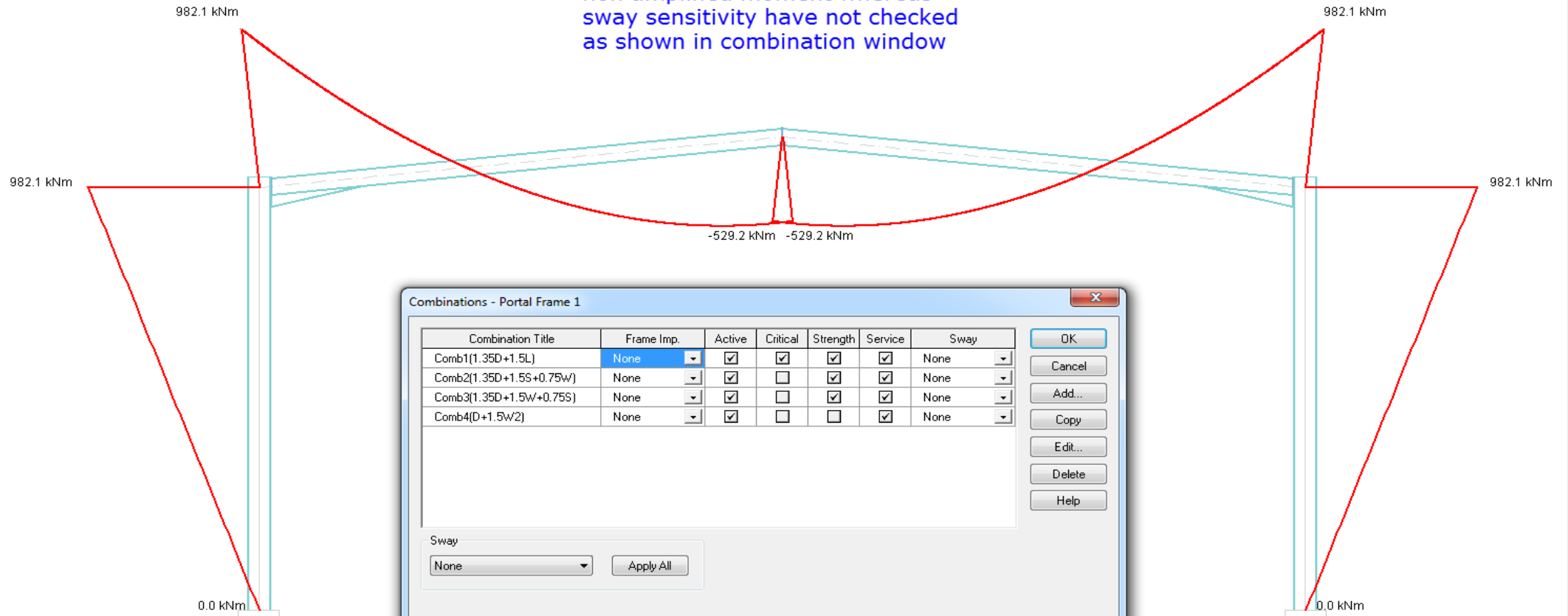
what i understand is that, if we doing hand calculation and we got global instability ($\alpha_{cr} < 10$) we must amplify the straining actions by one of these three methods.

but if we are using software - like robot- we can take the third choice directly and do second order analysis (p delta or large disp.) and straining actions will be automatically amplified, am i right??

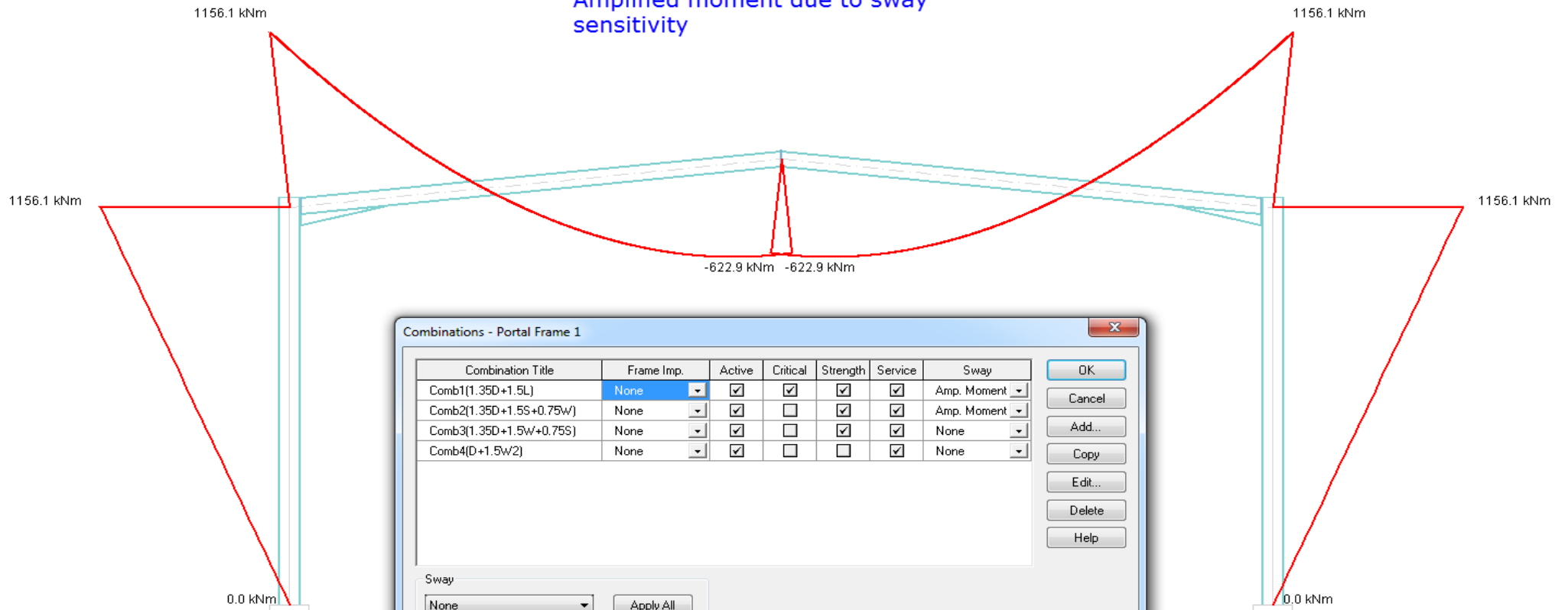
The methods apply to portal frames designed either by elastic design (see Clause 5.5.2 of BS 5950-1) or by plastic design (see Clause 5.5.3 of BS 5950-1).

It will almost always be preferable to perform these checks by software. It is possible to perform the checks by 'hand', but the results will almost invariably be less economical. The only benefit of the 'hand' method of second-order analysis is to gain a greater understanding of the response of the frame to the second-order (P-delta) effects and the loss of stiffness resulting from the formation of plastic hinges.

non amplified moment whereas
sway sensitivity have not checked
as shown in combination window



Amplified moment due to sway
sensitivity



Combinations - Portal Frame 1

Combination Title	Frame Imp.	Active	Critical	Strength	Service	Sway
Comb1[1.35D+1.5L]	None	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Amp. Moment
Comb2[1.35D+1.5S+0.75W]	None	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Amp. Moment
Comb3[1.35D+1.5W+0.75S]	None	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None
Comb4[D+1.5W/2]	None	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None

Sway: None

Apply All

OK Cancel Add... Copy Edit... Delete Help