Triangle zones in fold and thrust belts are enigmatic structures bound by foreland verging thrust zones and back-thrusts verging towards the hinterland. The geometry as well as kinematic evolution of these structures has been the subject of a wide range of studies over the last few decades. The understanding of triangle zone mechanics is incomplete although different driving mechanisms for their formation have been proposed. So far few – mostly analogue – modeling studies have focused on understanding the primary factors controlling their formation. Factors suggested to have a first order control on the formation of triangle zones include the rheological properties of the detachment and overburden rocks, the thickness of the overburden rocks, syn-tectonic erosion and sedimentation rate, fluid over-pressure conditions, and the angle of the detachment. Here we use the arbitrary Lagrangian-Eularian finite element code FANTOM to examine the development of triangle zones. We focus especially on the effect of the angle and rheology of the detachment, the rheology of the overburden strata, and syn-tectonic deposition.