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Mesoscale modelling of PBX. Binder effects. ALEC MILNE, JIM DUNNETT, NEIL BOURNE — In earlier work we have studied aspects of shock to detonation transition and detonation structure in polymer bonded explosives on the scale of the largest grains (the mesoscale) to augment continuum models for these processes. Building blocks have been unreacted Hugoniots of mixtures, mapping from experiment (2D micrographs and 3D tomography) for accurate initial conditions and details of cavity collapse mechanisms as hot spots for ignition. Recently we have applied continuum mixture theory (multi-phase modelling) to dirty binder (the mixture of explosive crystal fines and binder that surrounds the large grains) and validated it for the unreacted Hugoniot of a range of UK explosives. In this paper we build on all of this work and report our progress in using continuum mixture theory to model the reactive behaviour of dirty binder. We begin by considering the binder on its own and then use this continuum mixture mode in conjunction with mesoscale representations of PBX. We consider PBX9501 and a UK PBX as examples. We identify the numerical modelling issues that have arisen, our current approaches and our plans for further development and testing.

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