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## Development of C- shear bands in brittle-ductile shear zones: Insights from analogue and numerical models.

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Development of brittle and brittle-ductile shear zones involve partitioning of large shear strains in bands, called C-shear bands (C-SB) nearly parallel to the shear zone boundaries. Our present work aims to provide a comprehensive understanding of the rheological factors in controlling such SB growth in meter scale natural brittle- ductile shear zones observed in Singbhum and Chotonagpur mobile belts. The shear zones show C- SB at an angle of  $0^{\circ}$ -  $5^{\circ}$  with the shear zone boundary. We used analogue models, based on Coulomb and Viscoplastic rheology to reproduce them in experimental conditions.

These models produce dominantly Riedel (R) shear bands. We show a transition from R-shearing in conjugate to single sets at angles of  $\sim 15^{\circ}$  by changing model materials. However, none of the analogue models produced C-SB, as observed in the field. To reconcile the experimental and field findings, numerical models have been used to better constrain the geometrical and rheological parameters. We simulate model shear zones replicating those observed in the field, which display two distinct zones: drag zone where the viscous strains dominate and the core zone, where both viscous and plastic strains come into play. Numerical model results suggest the formation of C-SB for a specific rheological condition. We also show varying shear band patterns as a function of the thickness ratio between drag and core zones.