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Indian Geotechnical Journal

Local and global granular mechanical characteristics of grain-structure interactions

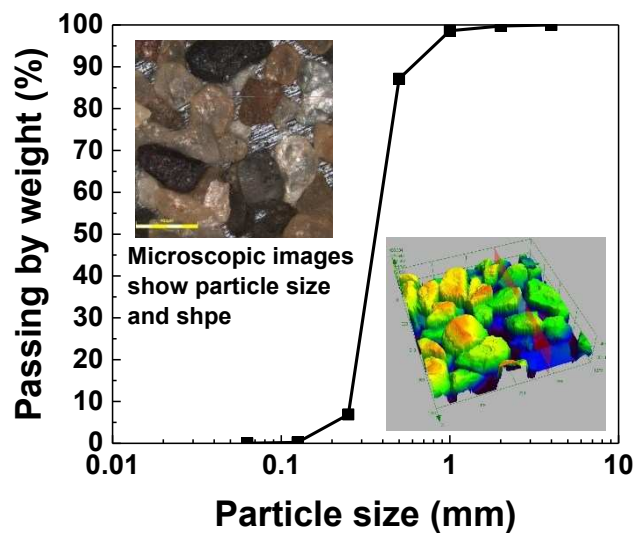
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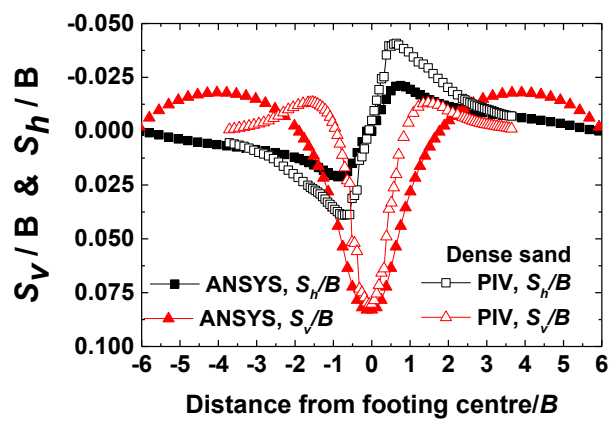
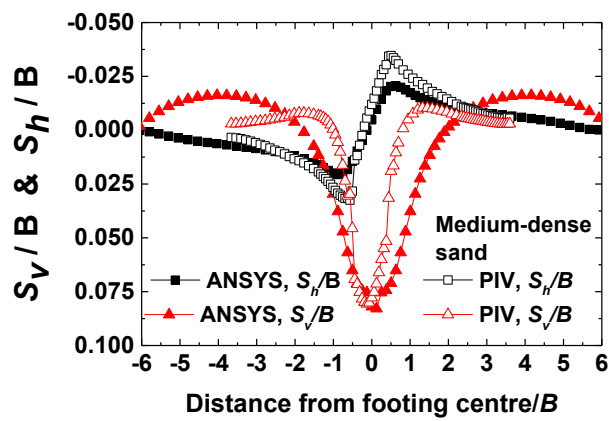
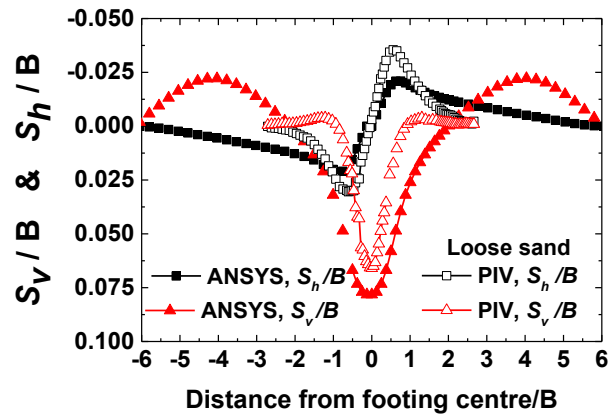
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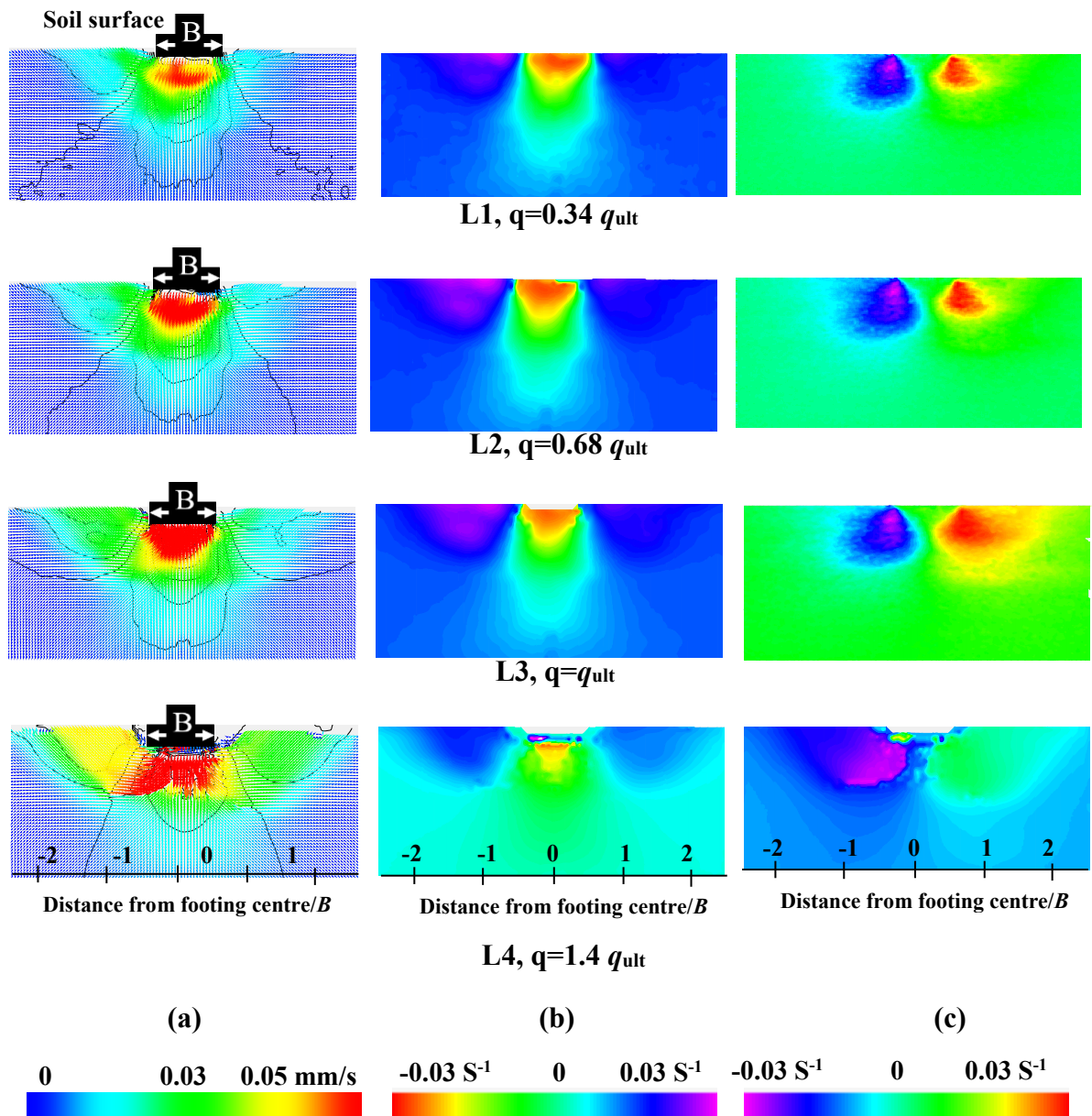
OR1 Particle size distribution curve of the sand (fine to medium-grained) using sieve analysis and high magnificant image



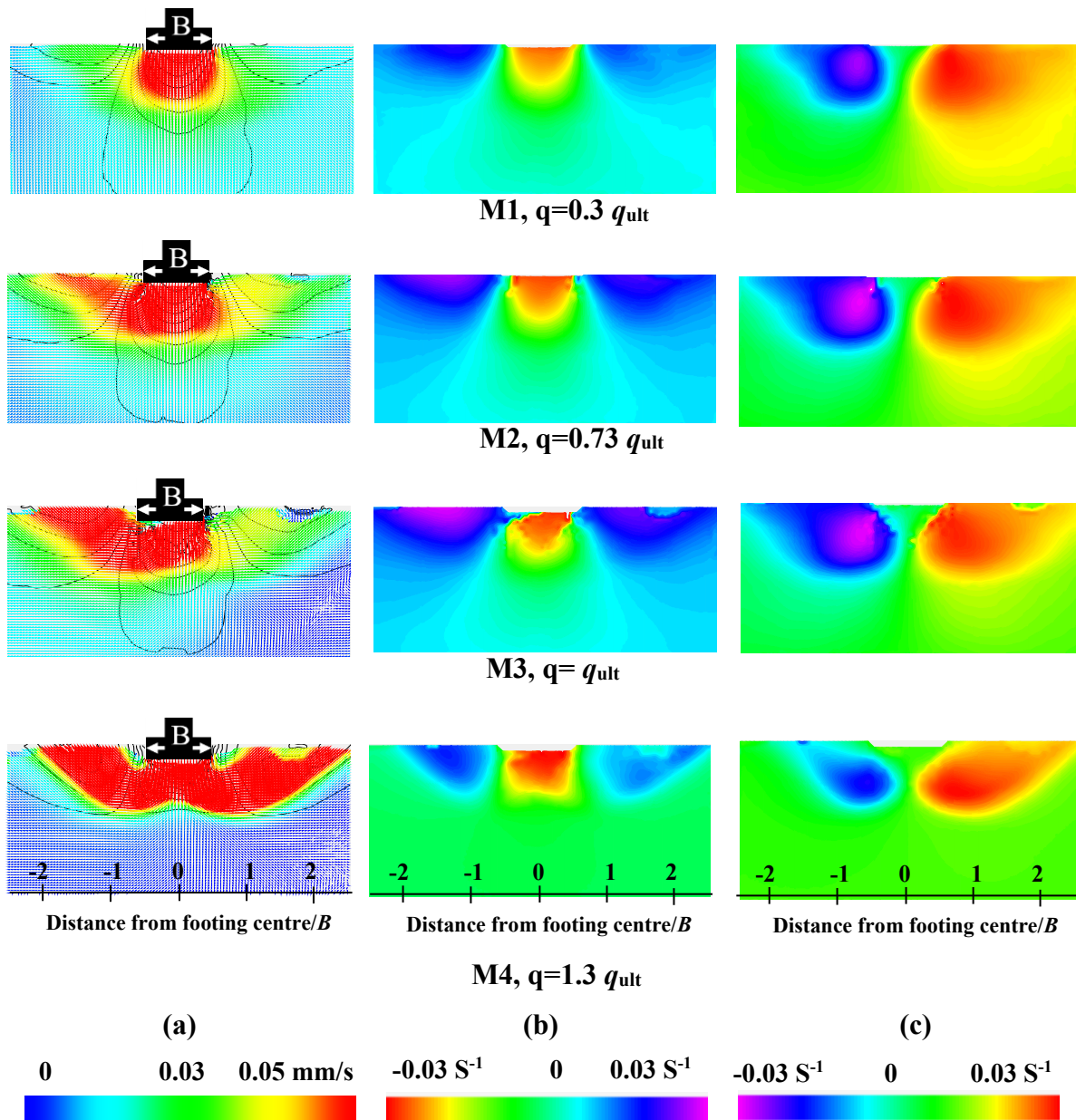
OR2 CPT test photo



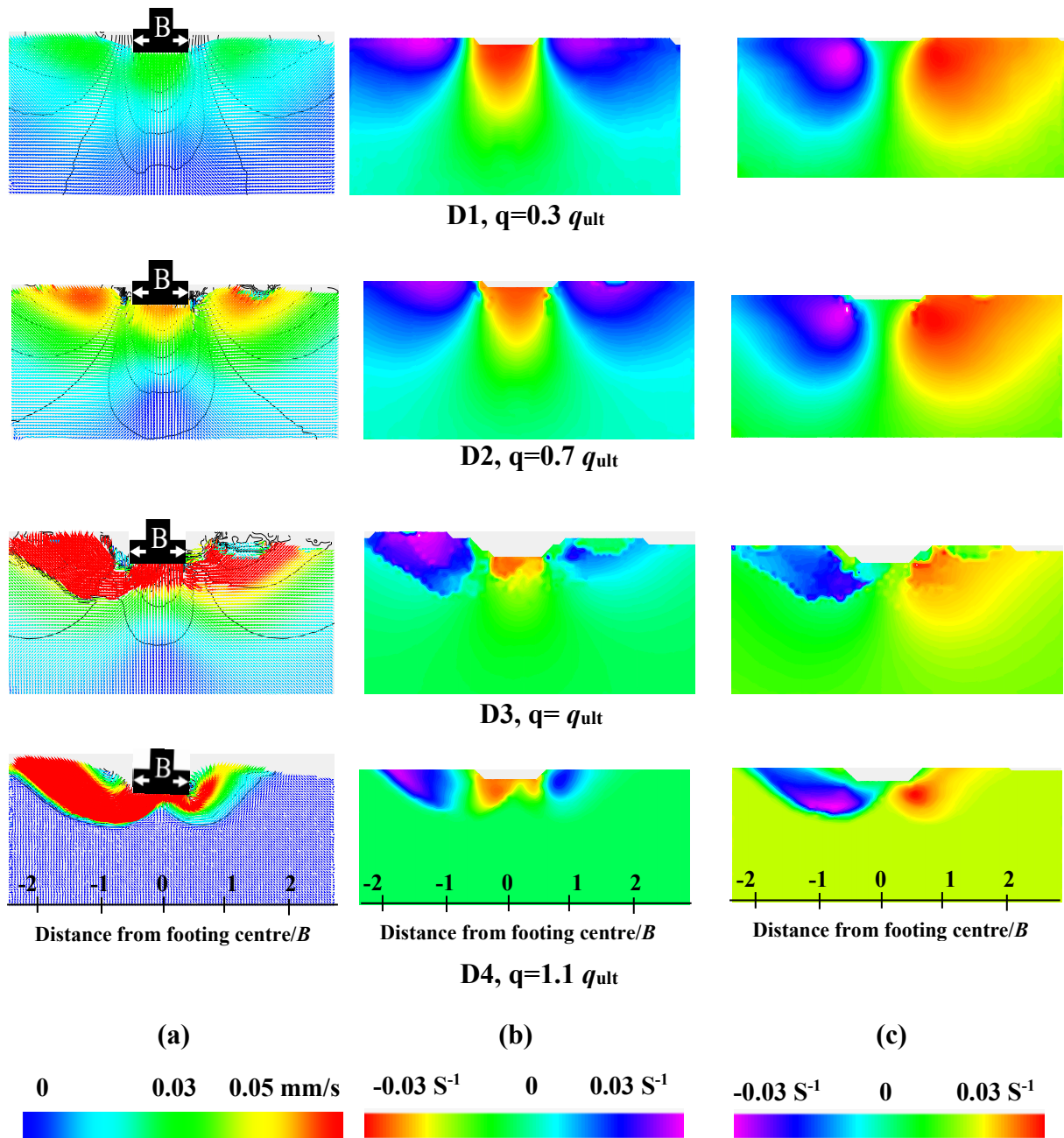
OR3 Comparison of PIV and FEM based results on the vertical displacement component (S_v/B) and horizontal displacement component (S_h/B) along a horizontal section at a depth of $0.5B$ below the footing on different sand packing



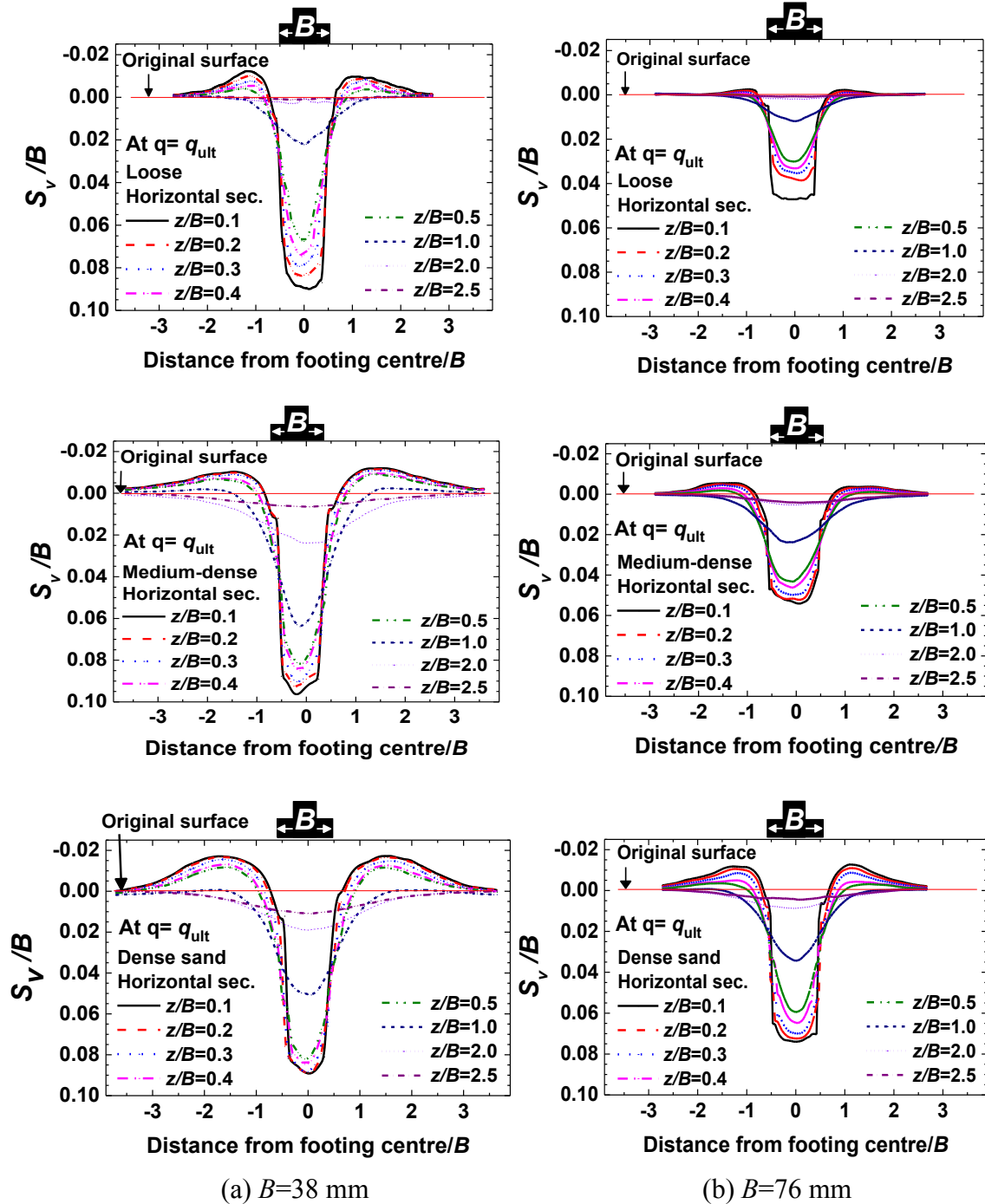
OR4 (a) Evolution of the resultant velocity vectors at a typical loads in loose sand and the scalar contours of the vertical velocity using PIV (b) vertical strain rate $\dot{\epsilon}_v$ (c) horizontal strain rate $\dot{\epsilon}_h$. Width of the footing, $B=38$ mm



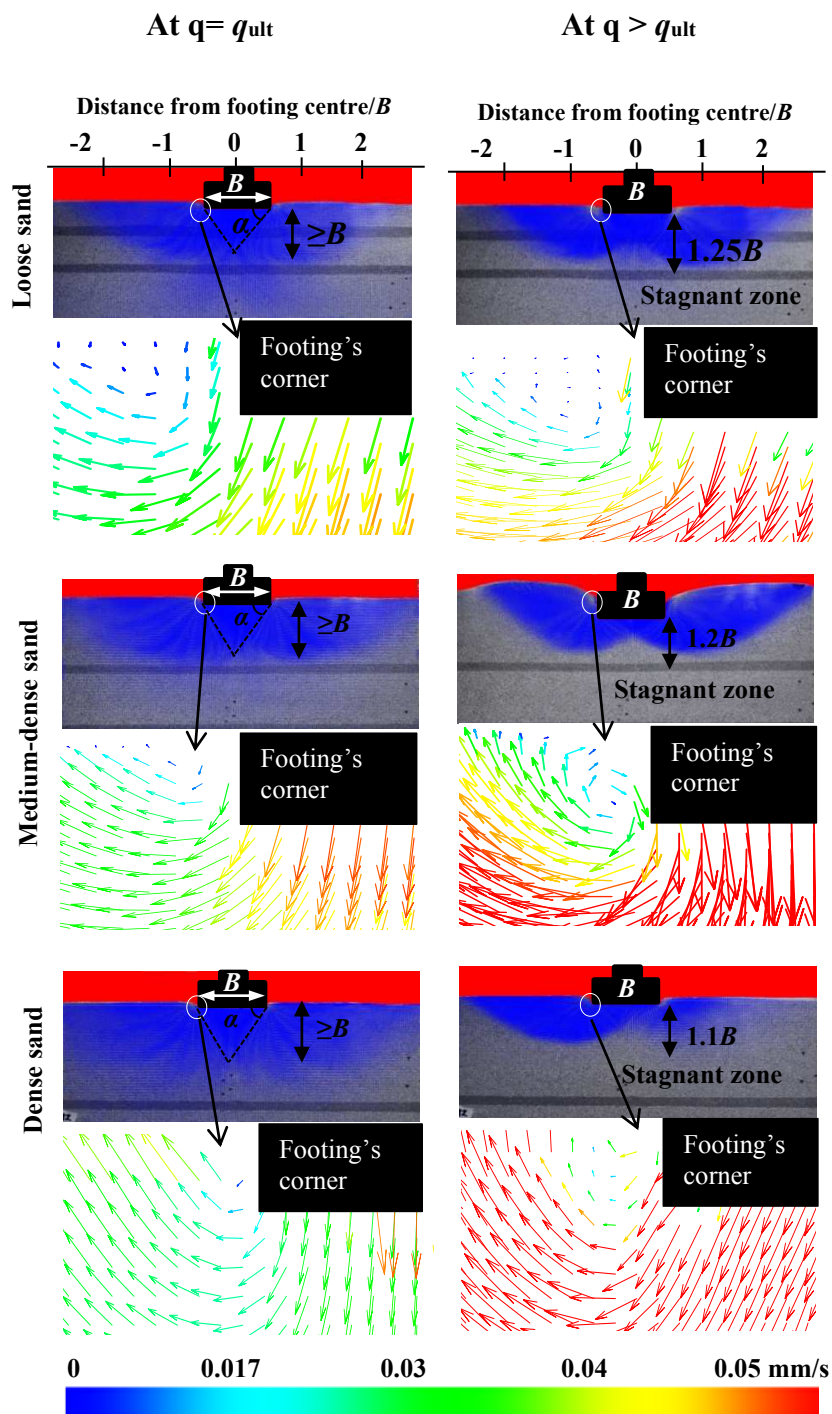
OR5 (a) Evolution of the resultant velocity vectors at a typical loads in medium-dense sand and the scalar contours of the vertical velocity using PIV (b) vertical strain rate $\dot{\epsilon}_v$ (c) horizontal strain rate $\dot{\epsilon}_h$. Width of the footing, $B=38$ mm



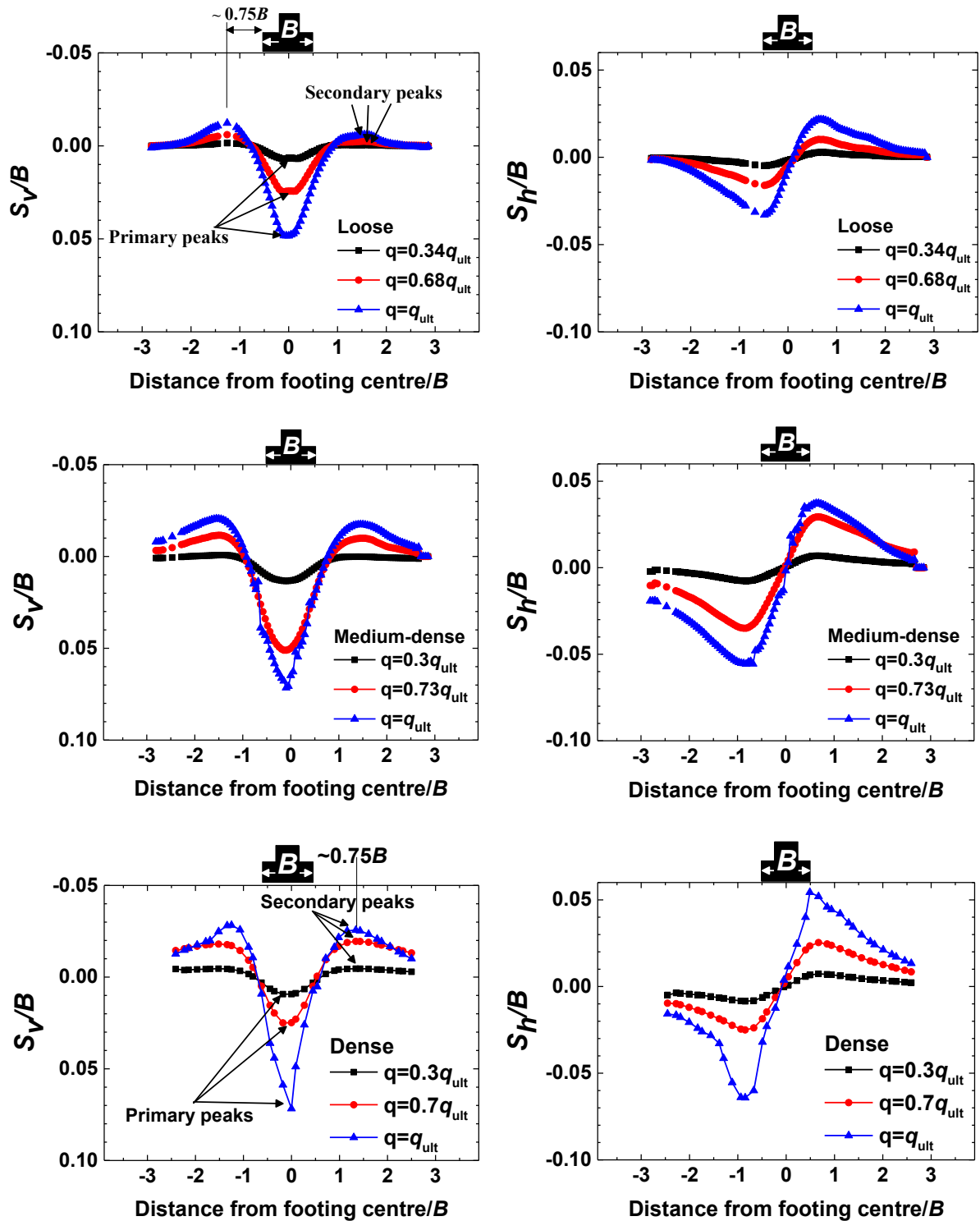
OR6 (a) Evolution of the resultant velocity vectors at a typical loads in dense sand and the scalar contours of the vertical velocity using PIV (b) vertical strain rate $\dot{\epsilon}_v$ (c) horizontal strain rate $\dot{\epsilon}_h$. Width of the footing= 38 mm



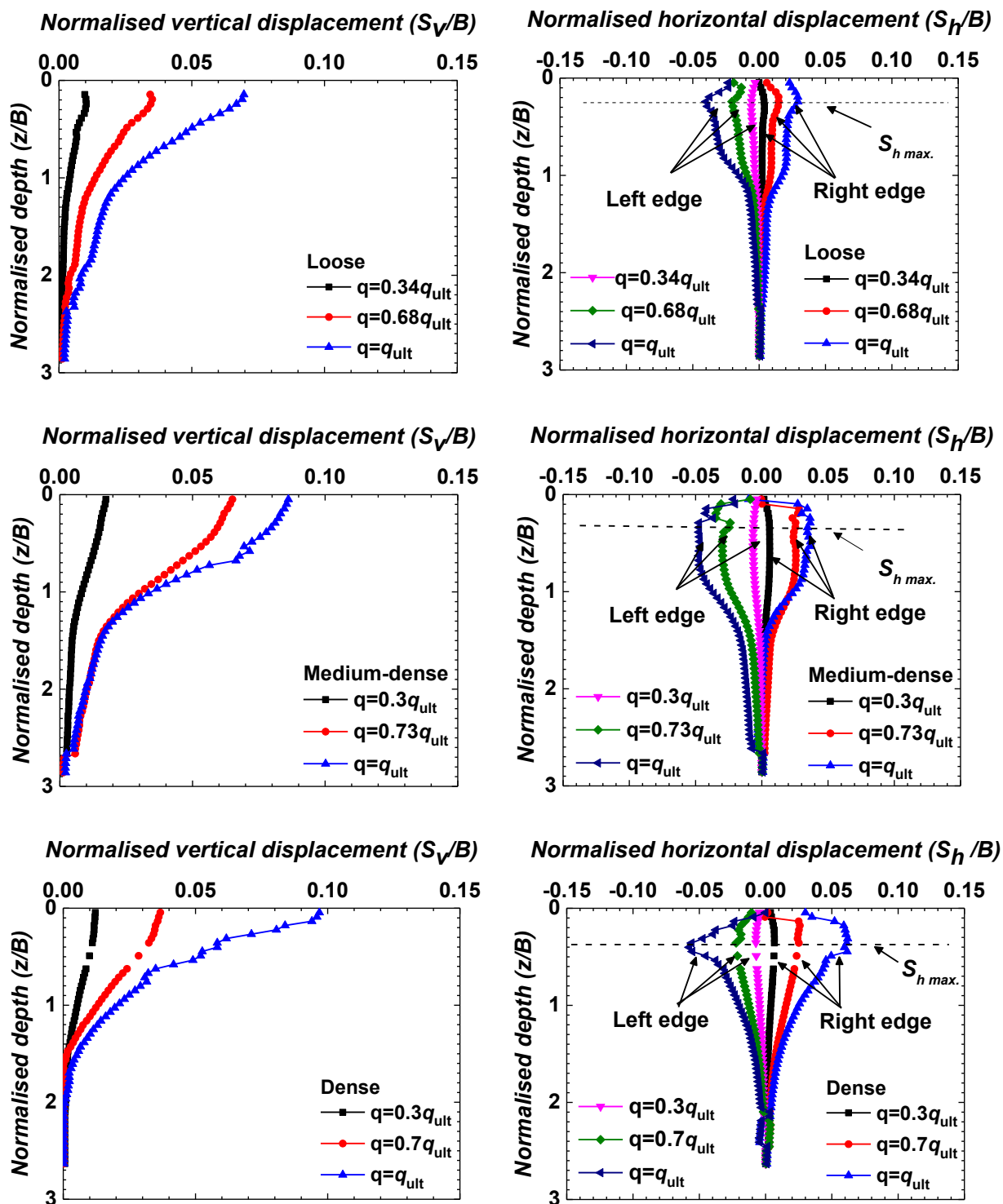
OR7 PIV-based normalised vertical displacement component profiles in different sand packings under the ultimate load ($q=q_{ult}$) along different horizontal sections at different depths (z/B) from the footing-soil interface



OR8 Vortex formation of resultant velocity vectors for footing ($B=38$) interacting with sand of different relative densities. Enlarged view of the corner of the footing is also presented here



OR9 (left) Normalised vertical displacement component (right) normalised horizontal displacement at a horizontal cross section $0.5B$ below footing using PIV at different loading levels in different sand packings. Signs: vertical displacement (positive down, negative up), horizontal displacement (Negative toward left, positive toward right from the central axis). $B = 38$ mm



OR10 Settlement profiles with depth z from the bottom surface of the footing at different loading levels: (left) normalised vertical displacement component, (right) normalised horizontal displacement for the sand packing. $B=38$ mm