On s-hamiltonian (connected) line graph

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A graph G is s-hamiltonian (resp., s-hamiltonian-connected) if the removal of at most s vertices from G results in a hamiltonian (resp., hamiltonian-connected) graph. An hourglass is a graph obtained from K_5 by deleting the edges in a cycle of length 4, and an hourglass-free graph is one that has no induced subgraph isomorphic to an hourglass. Broersma, Kriesell and Ryjáček in [Journal of Graph Theory, 37 (1999), 125-136] showed that every 4-connected hourglass-free line graph is hamiltonian; and Kriesell in [J. Combin. Theory Ser. B,82 (2001), 306-315] proved that every 4-connected hourglass-free line graph is hamiltonian-connected. We prove that for any integer s and for any hourglass-free line graph $L(G)$, each of the following holds. (i) If $s \geq 2$, then $L(G)$ is s-hamiltonian if and only if $\kappa(L(G)) \geq s+2$; (ii) If $s \geq 1$, then $L(G)$ is s-hamiltonian-connected if and only if $\kappa(L(G)) \geq s+3$.