Punching shear in slabs is analogous to shear in beams. Despite this similarity, current design codes provide distinctly different methods for the design of shear reinforcement in the two situations. For example, the Eurocode method for beam shear design is founded on the theory of rigid plasticity. To design shear reinforcement in slabs, on the other hand, the engineer must settle for an empirical equation. The aim of the study reported is to demonstrate that it is possible in a simple manner to design shear reinforcement in slabs based on the same rigid-plasticity foundation as for beam shear design. For this purpose, an extension of the upper-bound crack sliding model is proposed. This involves analysis of sliding mechanisms in yield lines developed both within and outside the zone with shear reinforcement. Various types of headed shear studs were considered. The results obtained using the model were compared with a large number of published test results, and satisfactory agreements were found.