This study investigates the changes in the skill structure of labour demand using panel data on Finnish private sector establishments, with linked information on worker characteristics. We also examine whether directly observable measures of technological change and trade explain the changes in skill structure of Finnish manufacturing sector plants' work force. Worker's skill level is defined by both education and age. The data on Finnish private sector establishments for years 1988-1998 reveal that the skill structure of work force has shifted towards highly educated and older. The increase in the share of both highly and less educated older workers has mainly occurred within establishments while the increase in the share of younger highly educated workers has occurred between establishments and by entry of new establishments. The decomposition analysis by plant characteristics reveals that the increase in the share of highly educated younger workers is attributed to relative increase in employment of exporting and R&D intensive plants, while the increase in the share of older workers has occurred equally within all plants. The panel estimation results without plant controls show that increase in the selected technology variables, industry- and firm-level R&D intensity increases significantly the demand for highly educated younger workers while the impact of this variables is much less pronounced or even insignificant for older highly educated workers. However, the fixed effects estimation results provide no evidence that R&D intensity would have an impact on the within-plant changes in the skill mix. With respect to the export-share variable the estimation results provide some evidence that trade decreases the demand for older workers.