Probabilistic fault displacement hazard analysis (PFDHA) is needed for a numerical estimate of the displacement likely to occur at a site near an active fault in case of a surface faulting earthquake. The methodology is based on parameters describing the probability of occurrence, and the spatial distribution of the displacement on and off-fault. The methodology was created for normal faulting setting, and has been later complemented with the parameters for other slip types, especially regarding the principal fault rupturing. Based on empirical fault displacement data in the Worldwide and Unified Database of Surface Ruptures (SURE), we are presenting new regression parameters for distributed faulting for dip-slip earthquakes. The parameters are used in a computational model for assessing the surface rupture hazard near active dip-slip faults. The modelling results the probability distribution of exceeding a chosen level of displacement, and can be used in stcture design and land-use related decision making in areas where surface faulting hazard should be considered.