The purpose of this study is to develop a soiling simulation system to predict the visual deterioration of outer walls of buildings. The simulation system outputs soiling predictive images that can be used in the designing process of buildings. This initial report proposes a method for drawing basic striped soiling, caused by raindrops, on the elevations in an architectural design. The first step was to collect photos of existing soiled walls. The second step was to propose a model formula. The third step was to apply the model formula to the collected soiling photos. The authors considered statistically predicting the coefficients for the model formula from building data. These coefficients were substituted into the model formula (the soiling predictive model), using which software that outputs soiling predictive images was created.