Firstly, when we start considering the problem about short-term and long-term probability distribution, the short-term is defined as the probability in the field of individual sections of roads and the long-term is defined as the continuous roads with a set of fluctuations.

With the measured data of the paper [7], we can directly fit those data to a reasonable curve. So, for the short-term, as it is defined in the paper of *Analysis and Simulation of Road Profiles,* it belongs to Gaussian probability distribution, and the equation is as follows.

Different from the single amplitude, the fluctuation amplitude is together with Rayleigh and Gaussian Distributions. Possibly a generalized gamma distribution can be appropriately put forward to describe the situation of road profile.

Where k is the continuous shape parameter(k>0), α is the continuous shape parameter(α>0), β is the continuous scale parameter(β>0), γ is the continuous location parameter.

Additionally, the following parameters should be made use of to explain the relevance of distribution and road profiles[7]:

* Moving RMS (root-mean square value) road surface elevation
* Moving crest factor
* Spectral characteristics
* Road surface elevation probability distribution characteristics (kurtosis statistics)
* Fluctuation amplitudes distribution characteristics (standard deviation of fluctuation amplitudes)
* Characteristics of transients (joint distribution of amplitude and duration)