

LINEAR HYPOTHESIS VS THRESHOLD HYPOSTHESIS

thoughts by R. Kithil June 2015

Linear Hypothesis (LH) is based upon theoretical assumptions. It is often wrong. Example: 150 ft (50m) Rolling Sphere radius results from a 50% calculated step of a descending leader and 50% of strokes exceed 28,000 amperes. 100 ft (33m) Rolling Sphere is 30% more conservative. IEC 62305-2 uses 60/45/30/20 radii--- Class IV/III/II/I --- for percentages of protection. Example 20m R.S = high 90% protection. LH may not accurate, since evidence shows lightning has its own agenda and can breach the rules. Can strike the bottom of a radio tower of the hillside of a mountain top. However, LH is useful for Codes & Standards since designs should be in general agreement with one another.

Threshold Hypothesis (TH) is based upon observation. Sometimes a portion of LH is mixed in. Example: Franklin Rods should be within 2 ft. of corners. Sharp edges may launch streamers, we want rods to collect them. Observation: rods should be closer than 2 ft., maybe just inches away from sharp edges. Example: rods do not protect people. Issues with people are step and touch voltages and flashover. Example: US Air Forces teaches NFPA-780. 780 is for “ordinary structures”. Conclusion: US Air Force LP teaching should look outside of NFPA-780.