**Exercises on High Voltage Engineering (March 27, 2025):**

**Exercise 3-12:** What is the main factors influencing insulator’s pollution flashover? Please describing the process of insulator’s pollution flashover.

**Exercise 3-13:** Why insulators of OHL in polluted area is more frequently looks like “burned” and flashover resulting power outage in fog, condensation or drizzle weather? but this phenomenon is rare in thunderstorm season?

**Exercise 3-14:** Why does power utility worry about the pollution flashover of insulators? What are the measures to increase the pollution flashover voltage of porcelain insulator?

**Exercise 4-1:** The basic types of dielectric polarization? What are their main features?

**Supplementary Exercise 1:** From the outdoor insulation experience of China's power grid in the past 50 years, what are the main factors that threaten the reliable operation of OHLs? And in recent 20 years, how the frequently experienced large-scale pollution flashover accidents effectively avoided?

**Supplementary Exercise 2:** An 1000kV UHVAC OHL passes through the area with pollution Class d.

1. One suggests that U300BN disc porcelain insulator as shown in Figure 3-4(a) of the textbook should be used for suspension string. How many such disc insulators should be used per string? What is the total creepage distance per string, and what is the string length?
2. Other one suggests that the two parallel strings should be used for tension-string, and the alternating shed disc insulator (U840BP/300T) at the bottom of page 37 of the document 2024-3-28-1 is used. How many such disc insulators should be used per string? What is the total creepage distance per string, and what is the string length? What is the total weight of the paralleled string? (The parameters of this type disc insulator are: diameter *D*, installation height *H*, creepage distance *L* are 420mm, 300mm, 650mm respectively, and weight of single piece is 35kg)

**Supplementary Exercise 3:** Compared with porcelain insulator, what are the advantages and disadvantages of silicone rubber composite insulator?

**Supplementary Exercise 4:** According to the relation curve between HC6 hydrophobicity and surface pollution flashover gradient provided in Figure 3-28 of the textbook, if an 1000kV composite insulator is selected for pollution level of SDD = 0.12mg/cm2, what is the creepage distance (m) of the composite insulator (the pollution withstand voltage could be 80% of the pollution flashover voltage)? If the ratio of creepage distance to string length is 3.2:1, what is the string length (m) of the composite insulator?