CONCRETE MOISTURE SOURCES: GROUNDWATER, CAPILLARY RISE & AMBIENT CONDITIONS

OVERVIEW

Concrete absorbs, releases, and transports moisture from multiple sources. Understanding these sources is fundamental to diagnosing failures and selecting appropriate moisture mitigation systems. Moisture migration is not limited to vapor emission; liquid water and environmental conditions also play critical roles.

Primary Moisture Sources

1. Groundwater & Hydrostatic Pressure
   - o External water sources push liquid water into slab.
   - o Occurs when grade level, drainage, or water tables are improper.
2. Capillary Rise
   - o Concrete draws water upward like a sponge through capillary pores.
   - o Common in slabs lacking a vapor retarder.
3. Ambient Humidity & Temperature
   - o High RH slows evaporation and increases vapor drive.
   - o Temperature changes cause vapor pressure differentials.
4. Moisture Entrapped During Construction
   - o Slabs placed over wet fill or in humid climates retain excessive moisture.

Impact on Coatings

- Blistering, delamination, or osmotic pressure.
- Extended cure times.
- Whitening, haze, or amine blush formation.
- Adhesion failure at slab/coating interface.

Best Practices

- Identify moisture source before selecting products.
- Install vapor barriers at time of construction.
- Use moisture mitigation systems when internal moisture is unavoidable.
- Improve exterior drainage to reduce hydrostatic influence.