1. **Building Structural Movement**
    a. 95% of contract documents reviewed require accommodation of vertical structural movement.
    b. Show where and how much building structural movement to be accommodated.
    c. L/360 does not work vs. glazed system manufacturer limitations.
    d. Manufacturer's standard details allow for less than ¼" structural movement.
    e. Sealant joint formula = double (movement + thermal) minimum.
    f. Who is responsible for the design of sealant joint for movement?
2. **Storefront**
    a. Storefront vertical span range 9'-12'. More horizontals = better span length.
    b. Architectural details are typically deficient showing shimmed head joints allowing for zero "0" structural movement.
    c. Make sure details show a receptor head. (95% require building structural movement).
    d. Receptors only accommodate about ½" maximum vertical structural movement – actual structural movement may be more, requiring a curtain wall system.
    e. Anchors are typically through glazing pocket and usually require straps back to structure.
3. **Curtain Wall**
    a. Spans 10' to 25' with deep systems.
    b. Taller spans at stairs require deeper systems or wind girts to support.
    c. Two-part open shapes require more steel reinforcement vs. tube shape mullions.
    d. manufacturer stock lengths (~ 22-24 feet) requiring ugly/expensive structural splice joints if not planned well. Longer stock lengths may require longer lead times.
    e. Watch for thermal bridging at floor connections. Utilize anchor systems with thermal breaks.
    f. Sealant joints at head details typically must be designed for building structural movement.
    g. Long-span jamb mullions may require movement joints > ½".
4. **Glass Railing and Wind Screens:**
    a. Windscreen applications are typically too much load for standard railing shoes.
    b. Glass guard under 2018 IBC requires a cap. ½" monolithic glass is usually not acceptable.
    c. Laminated glass is required except over non-walk areas.
    d. ICC AC439 testing is acceptable.
    e. Windscreens and glass guards for roofs cannot be installed over roofing membrane.
    f. Too many shims = much wobble in the railing.
    g. Ensure sufficient concrete curbs for anchoring (6" does not work for winds).
5. **Corner Modeling – 3d structural modeling should be performed:**
    a. Short return curtain wall and storefront sections may get pulled out by wind loads and require additional steel reinforcing to help with the joint between glazing systems and structure.
    b. Minimum bite requirements at corner mullions do require checking by specifications for in-plane movement created by wind load at corners. Maximum bite loss in plane is 1/4"
6. **Vertical Sunshades:**
    a. Deep cap extensions (12" or more) will add in-plane wind loads to glazing systems.
    b. Manufacturers have not designed systems to handle these in-plane loads.
    c. Specs typically limit in-plane movement to 1/8" – Deep caps may require a structural girt.
    d. Storefront systems with fill plates not usually capable of sunshade support.

Level 1 – Prelim Design Assist ~$3000

- Cladding design loads.
- Optimize system types for wind and seismic.
- Frame sizes, spacing and geometry.
- Show loads at structure.
- Flag potential code compliance challenges.

Level 2 – Prelim Design + ~$6000

- Level 1 plus: Detailed engineering all manufactured glazing systems.
- Assess building structural movement and coordinate manufacturer limitations.
- Design and detail joints for connections to the building.
- Insulated glass unit (IGU) design.
- Determine safety glazing locations.
- Specifications review.

Level 3 – Post Design & Installation Support

- Answer requests for Information.
- Submittal Reviews.
- 3rd Party Design Review including building structural movement.
- Site Visits Inspections & Reports.
- Forensic analysis & reports

Level 4 – Drafting & Shop Drawings

- CAD Input to Architectural Drawings and Details.
- Detailed Shop Drawings.
- Fabrication Drawings.
- BIM Models and Coordination.

Level 5 – Structural Glass Walls

- Determining applicable design loads.
- Design and detail anchorage for glass such as point support, fin supported systems and custom solutions.
- Design and analysis of laminated and Insulated Glass.
- Coordinate and account for building structural movement between trades impacting the glass scope.

Level 6 – Other Structural Glass Applications

- Analysis and design of glass railing and support design.
- Glass canopy analysis and design.
- Laminated glass floors and stair treads/landings analysis and design.
- Analysis and design of glass wind screens and structural supports.
- Analysis and design of ornamental glass and metals.

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