BC HYDRO HQ: DESIGN AND CONSTRUCTION CHALLENGES ON A BARREL ARCH CANOPY REPLACEMENT PROJECT

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Background

- 20 Story headquarters of provincial utility
- Constructed circa 1991 (25 years old)
- Reinforced concrete, clad with precast concrete and/or granite veneer
- Main 3 level arched canopy (upper 2 levels over conditioned atria space) plus 4 grade level canopies
- BECA in 2013/2014 identified that the “waterfall” was leaking into the lobby
- Condition review of the Main Entry Canopy Skylight in 2014
- Single glazed laminated + tinted glass lites, in curtainwall assembly(pressure-plate + caps) on “verticals”, butt joints horizontal, supported on HSS structural steel frame

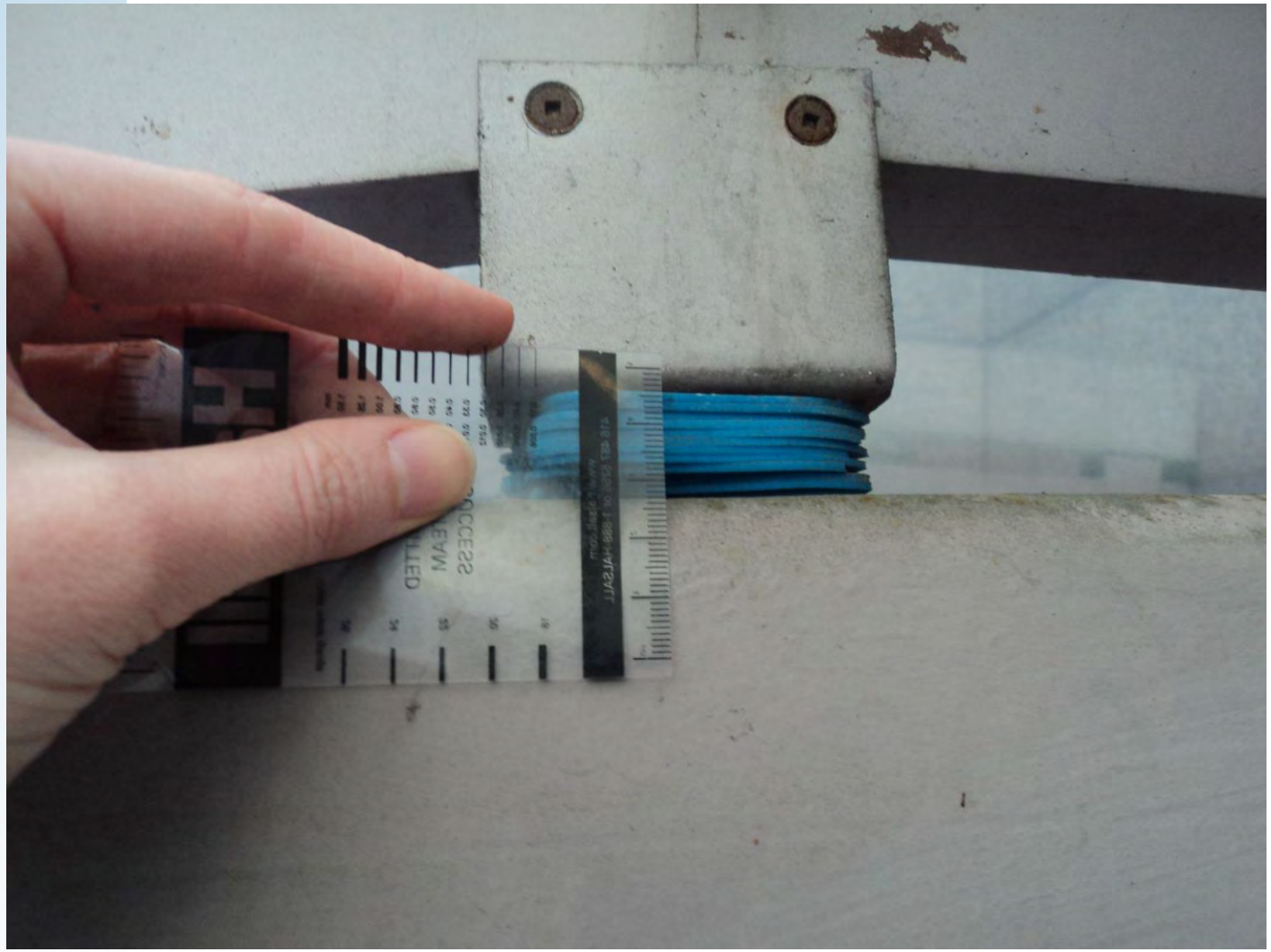
Curved Canopy Condition Review

Canopy Review Summary

- Broken lites, non-laminated, incorrect tint
- Missing +/or discoloured cover caps, aged sealant, fastener corrosion
- Dead flat horizontal lites, gutter defects
- Typical past repairs (turning the rainscreen partially into face-sealed) including:
    - * sealed caps (caps to glass, filled within)
    - * filled gaskets and caps (blocked drainage)
    - * multiple screws & screw holes in pressure plates
    - * damaged splines

All rectifiable in a straightforward repair,
but for one more thing ...

Structural Seismic Review



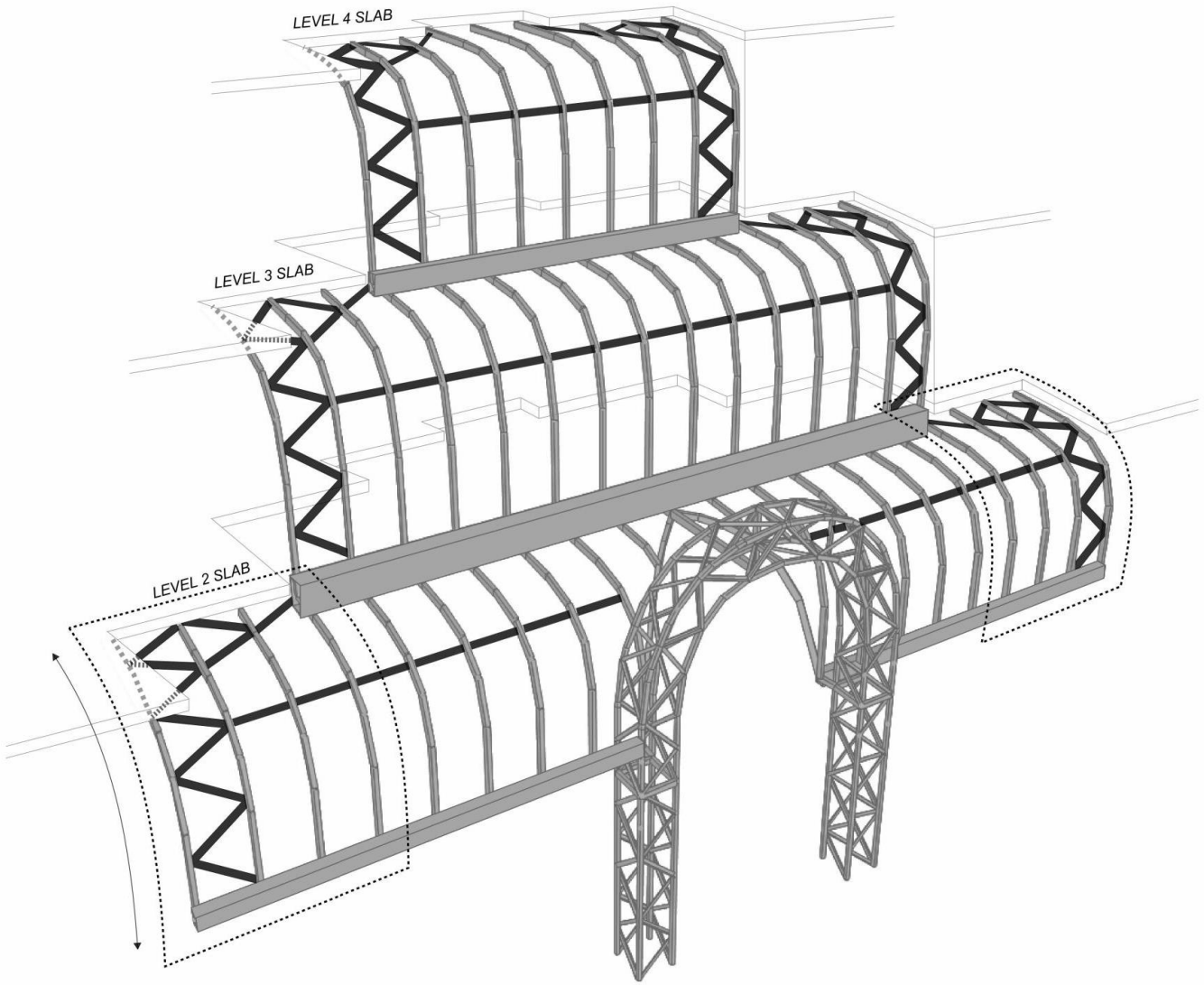
— Corroding Fasteners

— Spacers, unsecured

— Analysis of seismic performance
vs
new impending regulations

Structural Summary

- Replace all rafter-to-structural frame connectors
- Beams and anchorage some stiffening required
- Strengthen frame

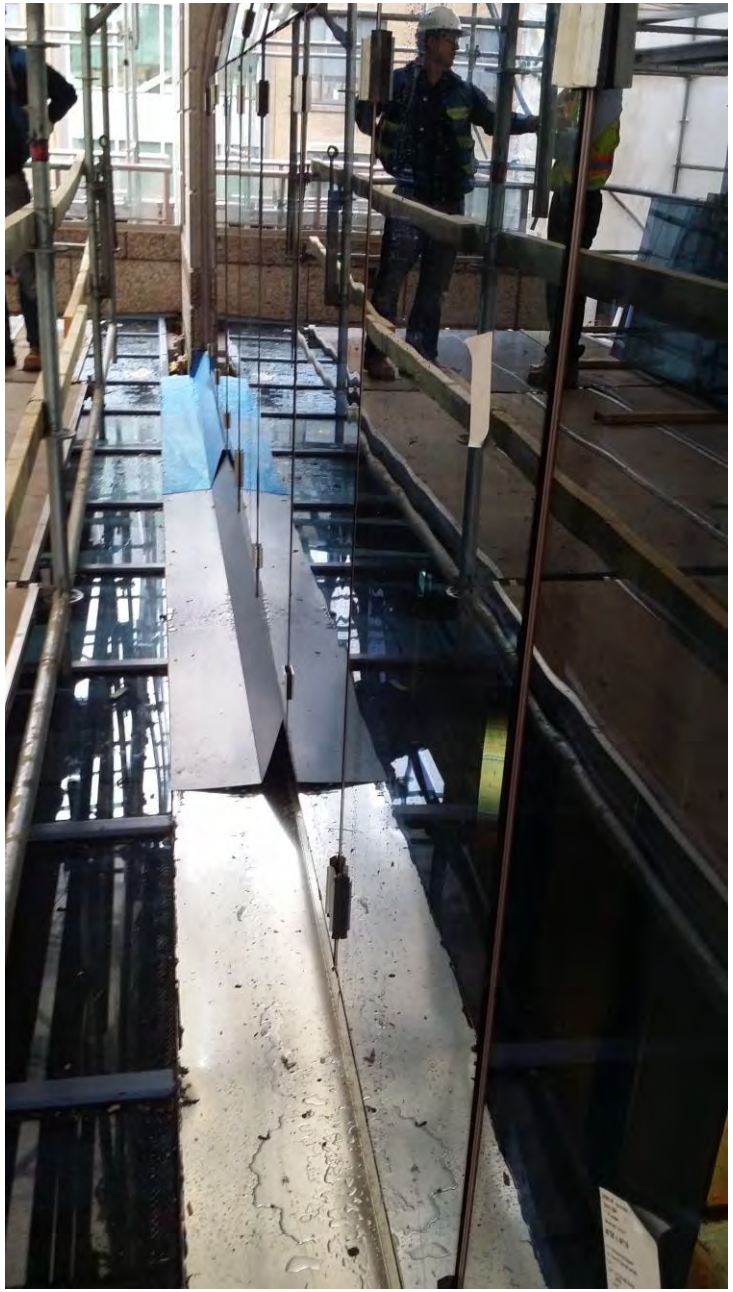


REPAIR OR REPLACE?

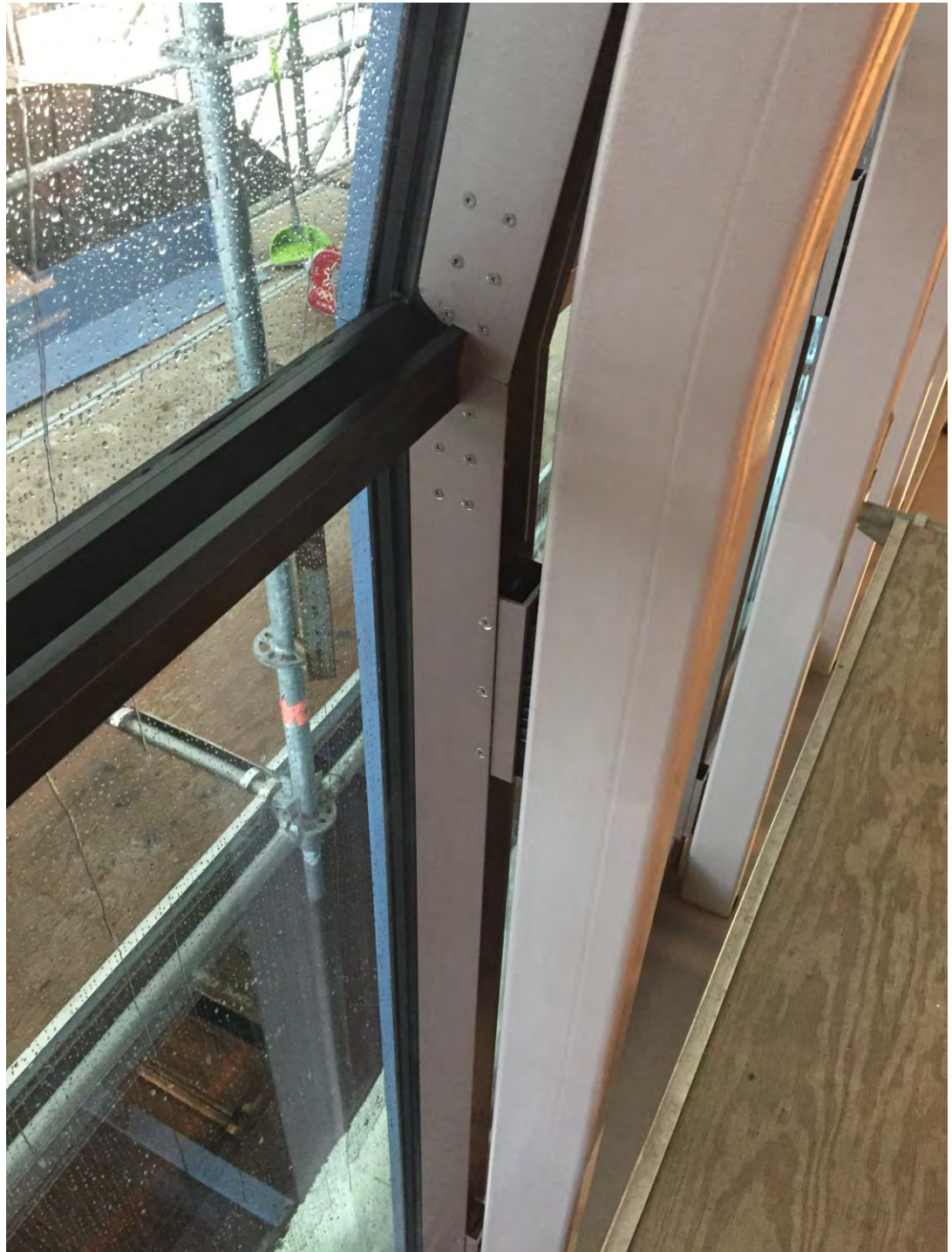
— Repair existing:
new glass, modify existing rafters, augment connectors, adjust alignment, and add Structural reinforcement
or

— Whole new system above structural frame

Single or Double Glazed?



STURDY



1 1/16 "
2 13/32 "

Hydro

P 6'8"
DO NOT ENTER
Parking
For
BC Hydro
Employees
Only
Thank you

SURPRISES

- Protection - extent & costs
- Value engineering of other aspects
  (rehab existing lower canopies, etc.)
- Double glazed is faster & cheaper?
- Geometry. Including alignment of horizontal joints with purlins and new structural members
- Perceived distortion in vision lites
- No time for full scale mock-ups and testing (funny that)
- Challenging changes to flashings
- Structural changes look great
  (actually not a surprise – knew they would)
- Energy Savings from IG! (I was wrong about that)

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