Great question. Here’s a practical roadmap you can use to **estimate load capacity and check structural integrity** of your post-and-beam deck cover concept—without producing formal drawings. I’ll keep it hands-on and list exactly what to measure and which checks to run.

**What you need to measure/know (variables)**

**Geometry**

* Beam clear span, (L) (ft or mm)
* Beam section size: width (b), depth (d) (e.g., 6×8 actual)
* Post height (unsupported length) and spacing
* Roof tributary width feeding the beam (half-panel spacing each side)
* Locations of posts relative to supports below

**Materials & grades**

* Wood species & grade (e.g., Western Red Cedar No.2)
* Fastener types, sizes, patterns; bracket model numbers
* Roof panel type & weight (aluminum, glass, polycarbonate)

**Loads (pick reasonable local values)**

* Dead load (DL): self-weight of beam + posts + panels + gutters, etc.
* Snow load (SL): local ground/roof snow (use municipal/BC values)
* Live/load for maintenance (LL): typically 20 psf for roof access (if applicable)
* Wind: pressure/uplift on panels; lateral shear on frame

**Adjustment factors (wood design)**

* Duration of load (snow = (C\_D)), wet service (C\_M), temperature, size factor, etc. (from NDS/CSA O86 tables)

**Checks to perform (in order)**

**1) Beam line loads**

Convert tributary roof area to a **uniform line load** on the beam:

* Area load (q) (psf) = DL + SL (+ LL if applicable)
* Line load (w) (plf) = (q \times) tributary width (ft)

**2) Beam bending & shear**

Assume a simply supported beam between posts (no middle post):

* **Max moment:** ( M\_{max} = \dfrac{w L^2}{8} )
* **Max shear:** ( V\_{max} = \dfrac{w L}{2} )

Section properties (rectangular):

* Section modulus ( S = \dfrac{b d^2}{6} )
* Moment of inertia ( I = \dfrac{b d^3}{12} )

Stresses:

* Bending stress ( f\_b = \dfrac{M\_{max}}{S} ) → must be ( \le F'\_b ) (allowable bending, adjusted for factors)
* Shear stress ( f\_v = \dfrac{1.5 V\_{max}}{b d} ) → must be ( \le F'\_v )

**Deflection** (serviceability):

* ( \Delta = \dfrac{5 w L^4}{384 E I} )
  + Check against limits (common roof limits: (L/240) to (L/180))
  + (E) = modulus of elasticity for your species/grade (adjusted)

**3) Bearing at supports**

* Bearing stress under the beam at posts:
  + ( f\_{bearing} = \dfrac{R}{A\_{bearing}} ) where (R) is reaction ((=V\_{max}))
  + Must be ( \le F'\_{c\perp} ) (perp-to-grain bearing)

**4) Post axial capacity & buckling**

* Axial load per post: take end reaction plus any additional tributary load
* Slenderness: effective length (L\_e), radius of gyration (r) (for 6×6, use wood column properties)
* Check column capacity using wood column formula (CSA O86/NDS) considering buckling; ensure adequate **bracing** length
* Make sure posts align over supports below for clean load path (you’re already doing this)

**5) Connections (critical)**

* **Top connection (beam-to-post):** bracket lateral capacity, uplift, and moment resistance. Use manufacturer allowable loads.
* **Base connection (post-to-deck/structure):** shear, uplift, and kick-out resistance; anchorage into framing, not just sheathing.
* **Roof joist-to-beam connectors:** check allowable downloads/uplift per bracket.

Connections usually govern failures—get the **exact model numbers** and use the manufacturer’s load tables.

**6) Lateral stability (your big concern)**

Because the aluminum roof doesn’t brace the frame:

* Provide **lateral load-resisting system**:
  + Knee braces/diagonals in the post–beam plane (both ends)
  + Or a moment-resisting post-to-beam connector rated for lateral
  + Adequate base anchorage to resist sliding/kick-out
* Check **overturning/uplift** from wind pressure on panels → hold-downs as required

**Quick sanity checks (rules of thumb)**

* **Span vs depth:** For solid sawn beams, depth in inches ~ span(ft)×(something like 0.6–0.75) for modest loads; long spans (20 ft) with 6×8 often **deflection-govern** under snow—verify.
* **Deflection matters** for glass/polycarbonate seals and gutters—keep within (L/240) (more stringent is better).
* **Middle post option:** If any check fails, adding a center post halves span → moment drops ~75%, deflection ~drops by 1/16 (very effective).

**What to collect on site (so you can run numbers)**

1. Exact **clear span** and **tributary width** to the beam
2. **Species/grade** stamps (or choose conservative values)
3. **Actual dimensions** of the 6×8 (planed size)
4. **Panel weights** (lb/ft²) and **gutter** weight/spacing
5. Local **snow load** (use your municipality/BC building data)
6. **Bracket models** (top/bottom/post bases/roof joist hangers) and fastening schedule
7. **Post heights** and bracing opportunities (knee brace length/angle)

**Why an engineer might still be needed**

You can do the math above to **screen** the concept. But two items often require professional judgment:

* Selecting **appropriate design loads** (snow drift, wind exposure, partial loading)
* Verifying **lateral system** and **connections** as a whole (global stability)

If you want, I can give you a **fillable worksheet** (inputs + formulas) you can reuse on projects. Or send me your measurements (span, section, tributary width, species/grade, bracket models, and a snow load value you plan to use), and I’ll walk the numbers with you step-by-step.