Value Engineering

Value Engineering Basics

Goal and Objective

- Goal = Get you to THINK CREATIVELY for each new project. Don't just accept the norm or standard procedure.
- Objective = True Value engineering balances effective design and cost in order to meet the end user's needs

Value Engineering Primary Framing

- In general, single slope more expensive than gable
- Eliminate exterior column on load bearing masonry
- Flange brace to masonry to eliminate unsupported columns
- Rod brace between endposts to avoid half-load endframe
- Increase endpost spacing to 25' on buildings wider than 150'

Value Engineering Primary Framing

- Consider open web for large spans with large loads
- Large bays require soldier columns for girts
- Know required deflection, don't use more
- Fixed base columns to reduce drift (H/200, H/400, etc.)
- Fixed top of Int. Col. to reduce drift (3-plt)
- Post & Beam corner column turned as endpost at open wall

Value Engineering Primary Framing

- Avoid unsymmetrical hips and/or valleys if possible
- Face bolted columns at: open web, portal brace, stepped columns, and unsupported columns.

Primary Framing
Rigid Frame (RF)

- >60 ft., CB- or CT- usually more economical
- In general, the higher the slope, more economical (1:12 better than 1/2:12; 1.5:12 better than 1:12; etc.)
- >3:12, $ tends to increase

Primary Framing
Continuous Beam (CB) or Truss (CT)

- In general, the lower the slope, more economical (1/2:12 better than 1:12; 1:12 better than 1.5:12)
- Remember, 1/2:12 slope is minimum for PR roof
- Remember, 1/4:12 slope is minimum for SSR and SLR

Primary Framing
Continuous Beam(CB) or Truss (CT)

- In general, reducing IC spacing reduces $$
- As eave ht. increases, more feasible to increase IC space
- Equal spaces not always most economical
- If possible, decrease IC space nearer sidewall
- Remember to consider additional Int. Col. in foundation cost!

Continuous Beam or Truss

- Int. Col. Placement (Equal IC Spacing)
- 150 ft CB-2 (3@50), is better than CB-1 (2@75)
- Int. Col. Placement (Unequal IC Spacings)
- 150 ft CB-2 (45',60',45') may be better than (3@50')
- Note that you must consider additional IC in foundation cost!

Primary Framing
Unibeam (UB)

- Typically competitive with RF up to 50 ft
- Straight columns standard, usually shallow

Primary Framing
Open Web Framing

- Great with large spans and large loads
- Allows equipment to pass thru web, may lower eave height
- Framing looks like so-called "conventional" framing
- Shop Coat: painted utilizing dip tanks to ensure complete coverage
- Frame allows smaller horizontal reaction, thus smaller foundation

Value Engineering
Bracing

- Rod bracing is most economical
- Torsion brace in lieu of portals when possible
- Consider bracing between Int. Cols.
- Masonry wall as shear wall if possible
- Rod brace to floor
- Consider partial height rods

Bracing
Torsional Bracing Allowed

- max. 50 ft width
- two bay min.,with endwall X bracing.
- Three bay minimum otherwise
- max. 90 mph wind
- max. 18 ft eave height
- max. 1:12 roof pitch
- Call VP if you are unsure of any situation!

Bracing
Torsional Bracing Allowed with additional investigation

- Seismic considerations
- Parapet walls
- Bay spacing less than 20ft
- Special code / specifications

Bracing
Final Thoughts

- DO NOT mix bracing components!
- Check with VP for any situation you are unsure of!

Value Engineering
Secondary Framing

- Use continuous purlins and girts for most economical design
- Consider 6 1/2" members at smaller bays
- Consider 11 1/2" purlins at greater than 30 ft bays and/or greater than 30 psf live load
- Consider 11 1/2" purlins with greater than L/180 deflection with greater than 25 ft bays
- Sag angles in roof recommended at greater than 25 ft bays
- Consider 11 1/2" with PR in lieu of bar joists with SSR

Value Engineering
Miscellaneous

- Building Orientation: Make the least dimension the width
- 27'-6 bay x 40'-0 Int. Col. spacing is usually most economical grid

Value Engineering Masonry Systems

- Full height systems normally require wind beam at top to support wall, L/240 assumed unless informed
- Deflection: H/100 for 10 yr. wind (H/75 for 50 yr. wind)
- Consider a "shelf" angle at endwall to support purlins in lieu of endframe
- Curb walls can be supported with a beam or channel at top of wall

Value Engineering Deflection

- Frames with taller eave heights and/or high wind are more susceptible
- VP Standard is H/60 for 10 yr wind (H/45 for 50 yr wind)
- Masonry: H/100 for 10 yr (H/75 for 50 yr)
- Cranes: H/100 for 10 yr (H/75 for 50 yr)
- Dryvit and other brittle systems, deflection must be provided by supplier
- Fixed base columns handle deflection well, foundation cost will increase
- Fixed top of IC helps resist horizontal drift

Value Engineering Mezzanine

- Run beams the shorter distance, let bar joists span the longer distance
- Rule of Thumb: length of beam in feet is approximate depth of beam in inches (30'=30")

Secret to Successful Project

- Product knowledge and it's application are two important factors in the "secret" to the process of building a successful project.

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