AUG.27-29 2019

TEKLA BASECAMP

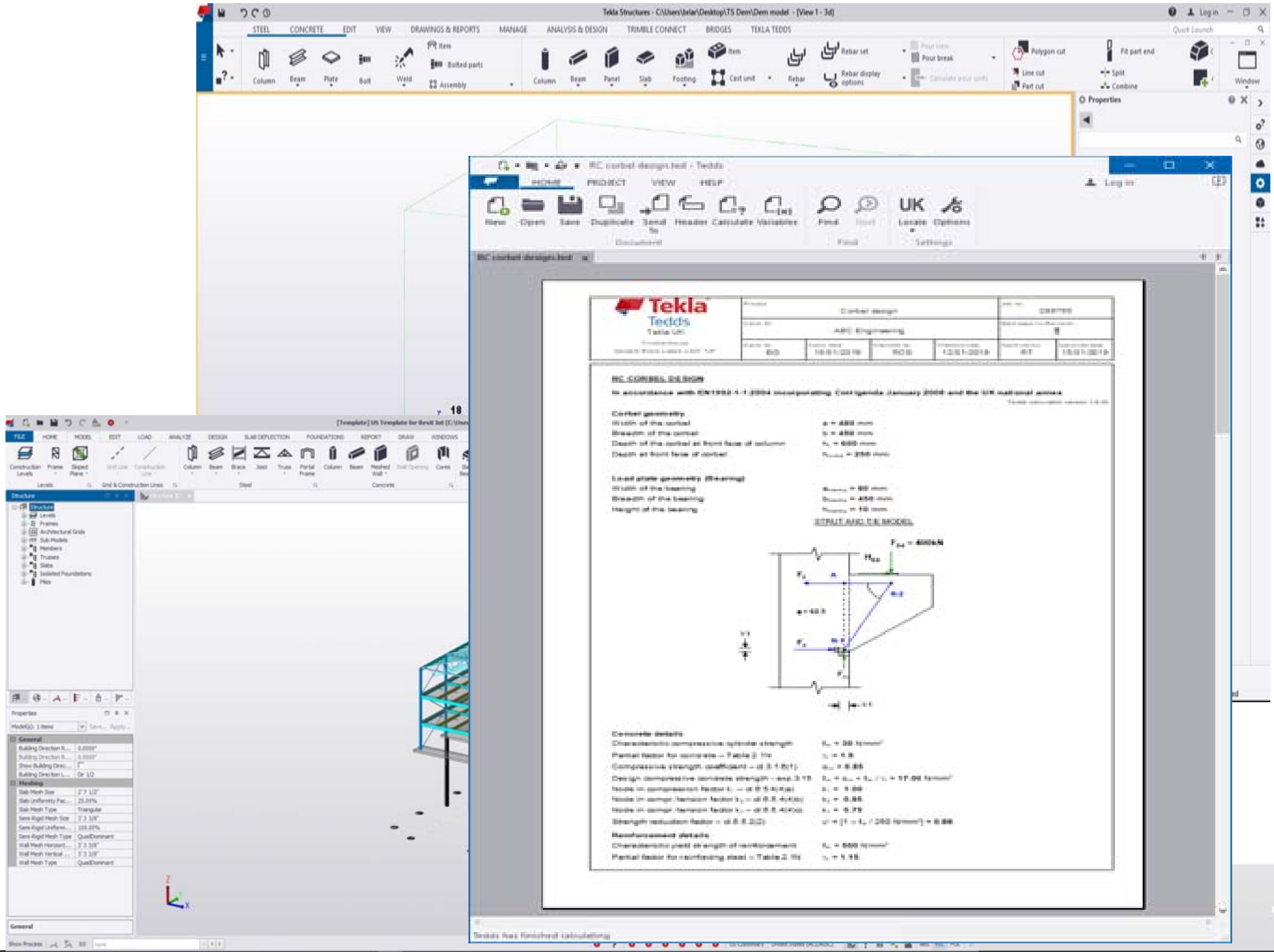
Introduction to Tekla's Analysis and Design Solutions: Tekla Structural Designer and Tekla Tedds

Brian Armour, PE
Business Manager, Analysis and Design

Trimble.

Tekla- One Solution

- Aligned the interface for common experience across Tekla software



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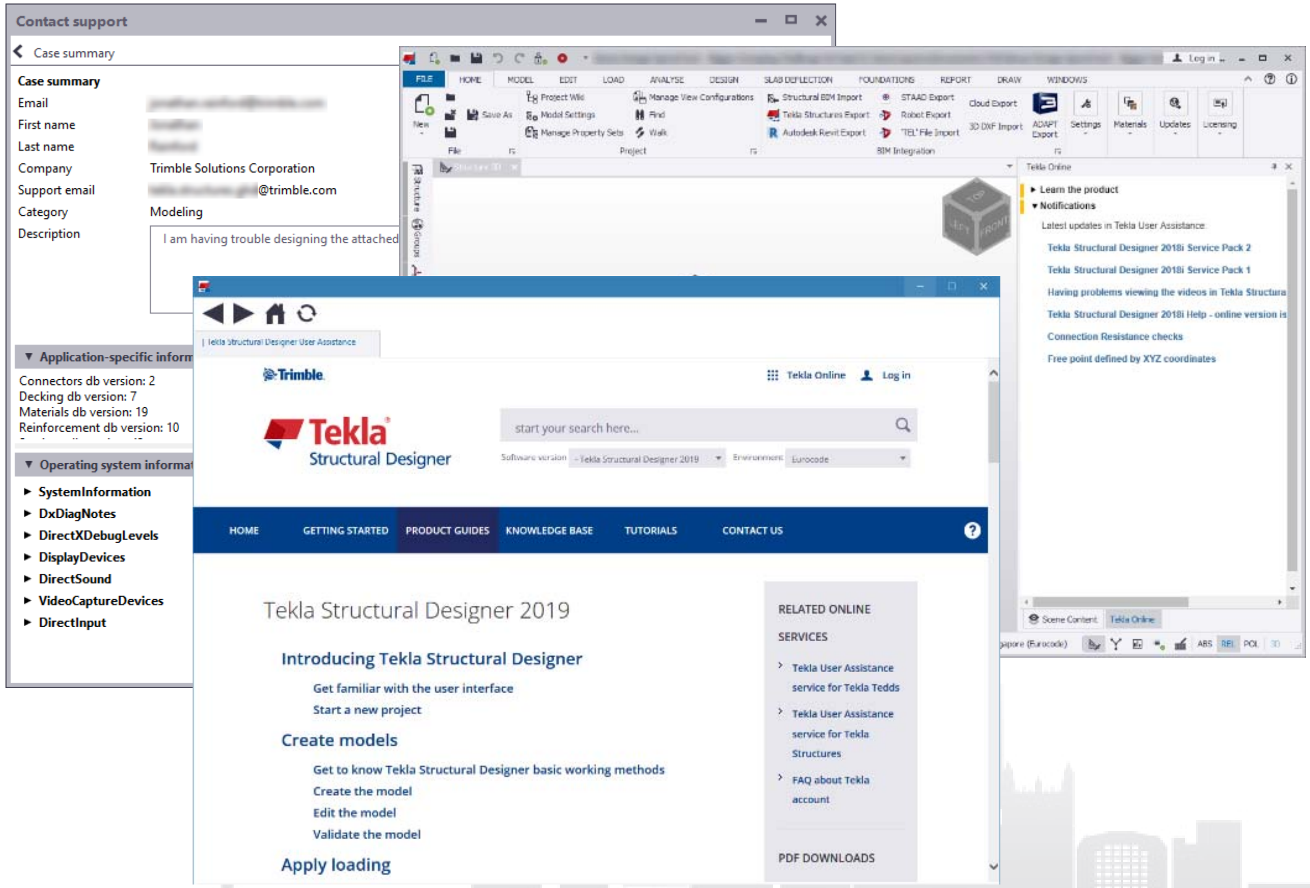
Tekla- One Solution

- Giving you a common user experience when using Tekla
- Common Controls are now included in all applications
  - Support Tool
  - Side Pane
  - Help Viewer
  - ATC Login



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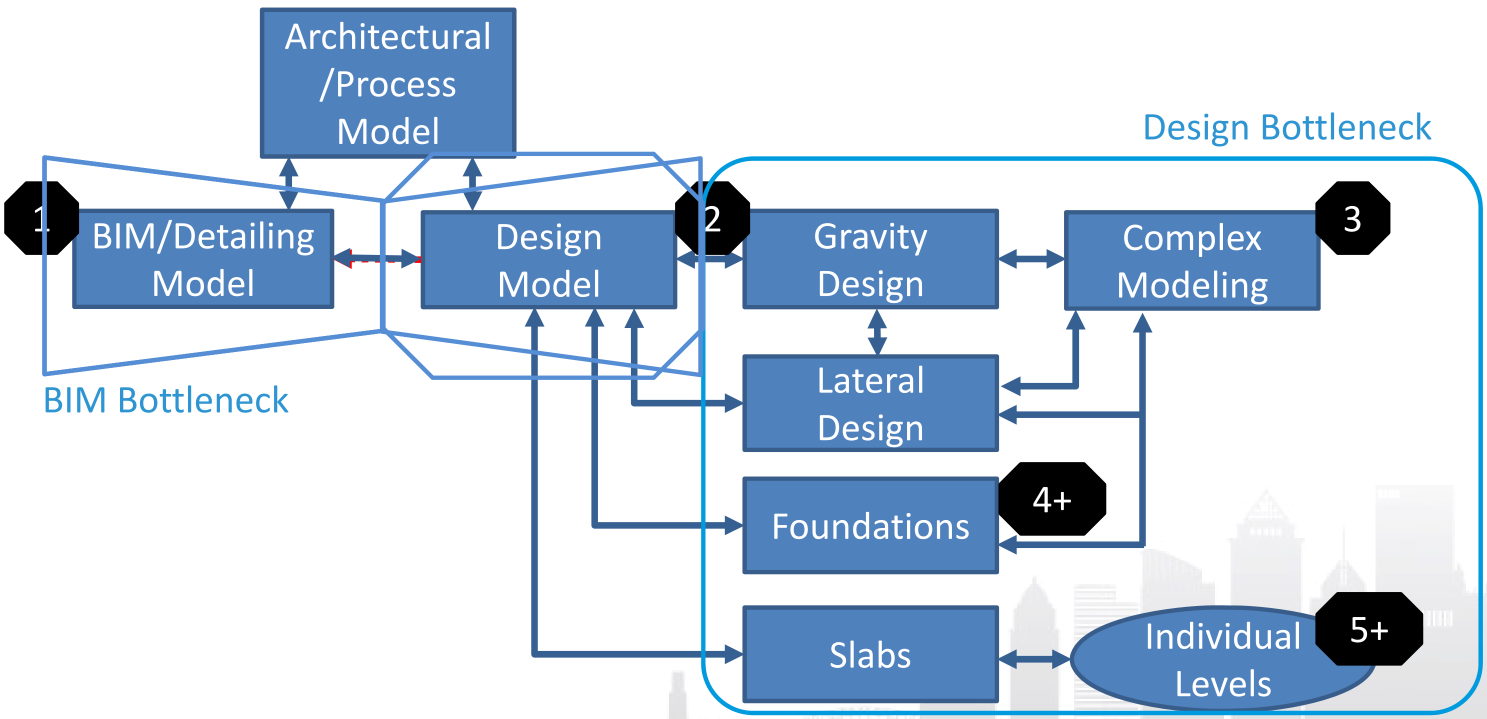
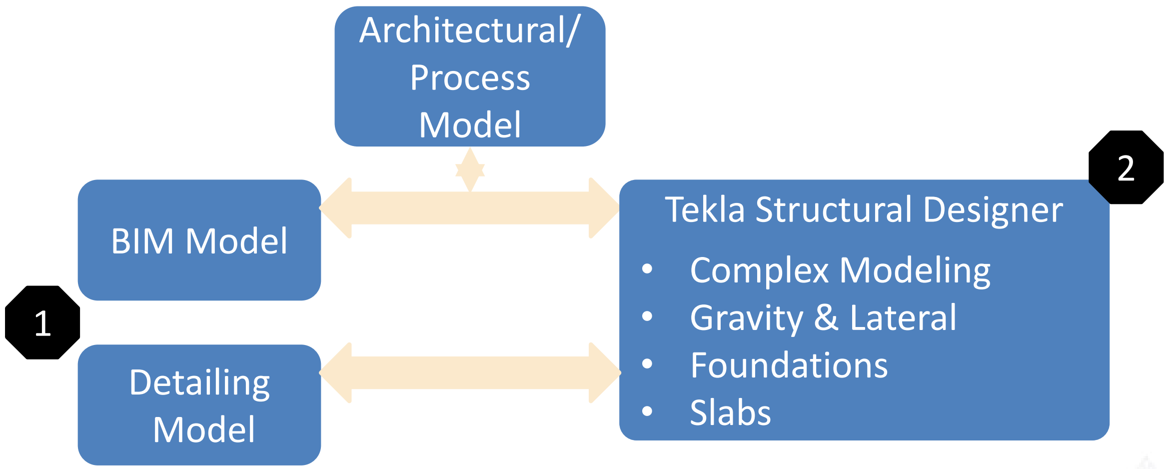
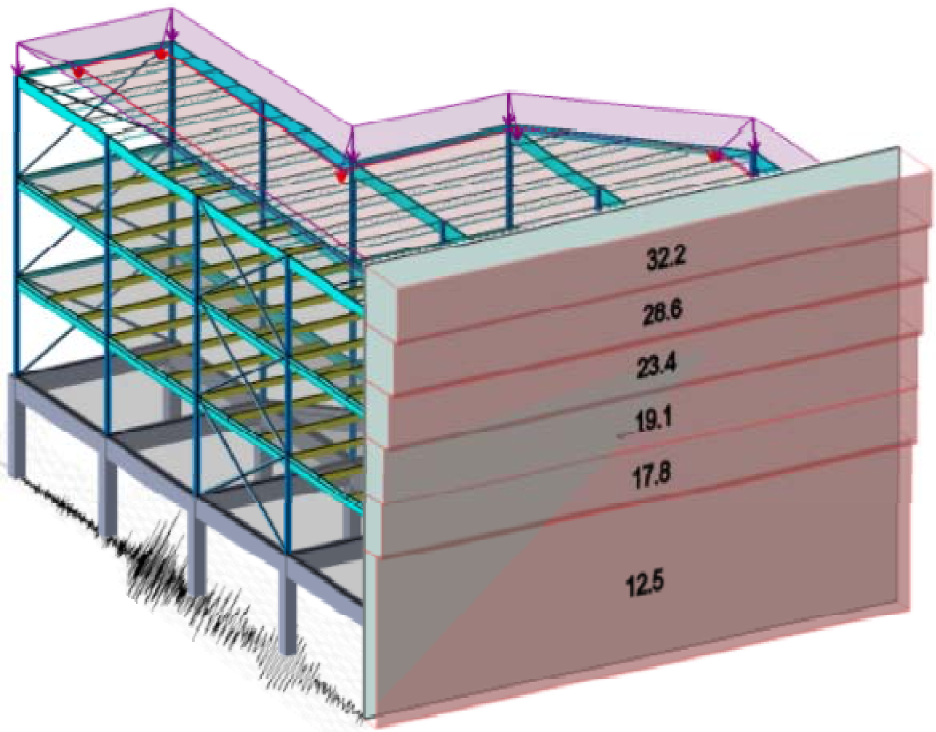
Current Project Workflow

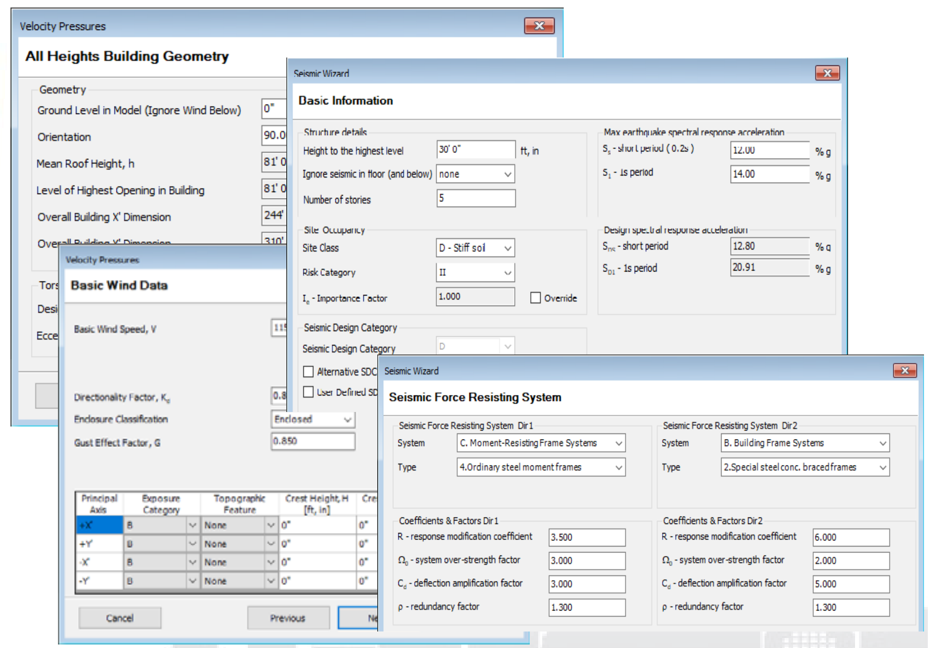


Enhanced Project Workflow



Confidence in Loading- Automated snow, wind and seismic





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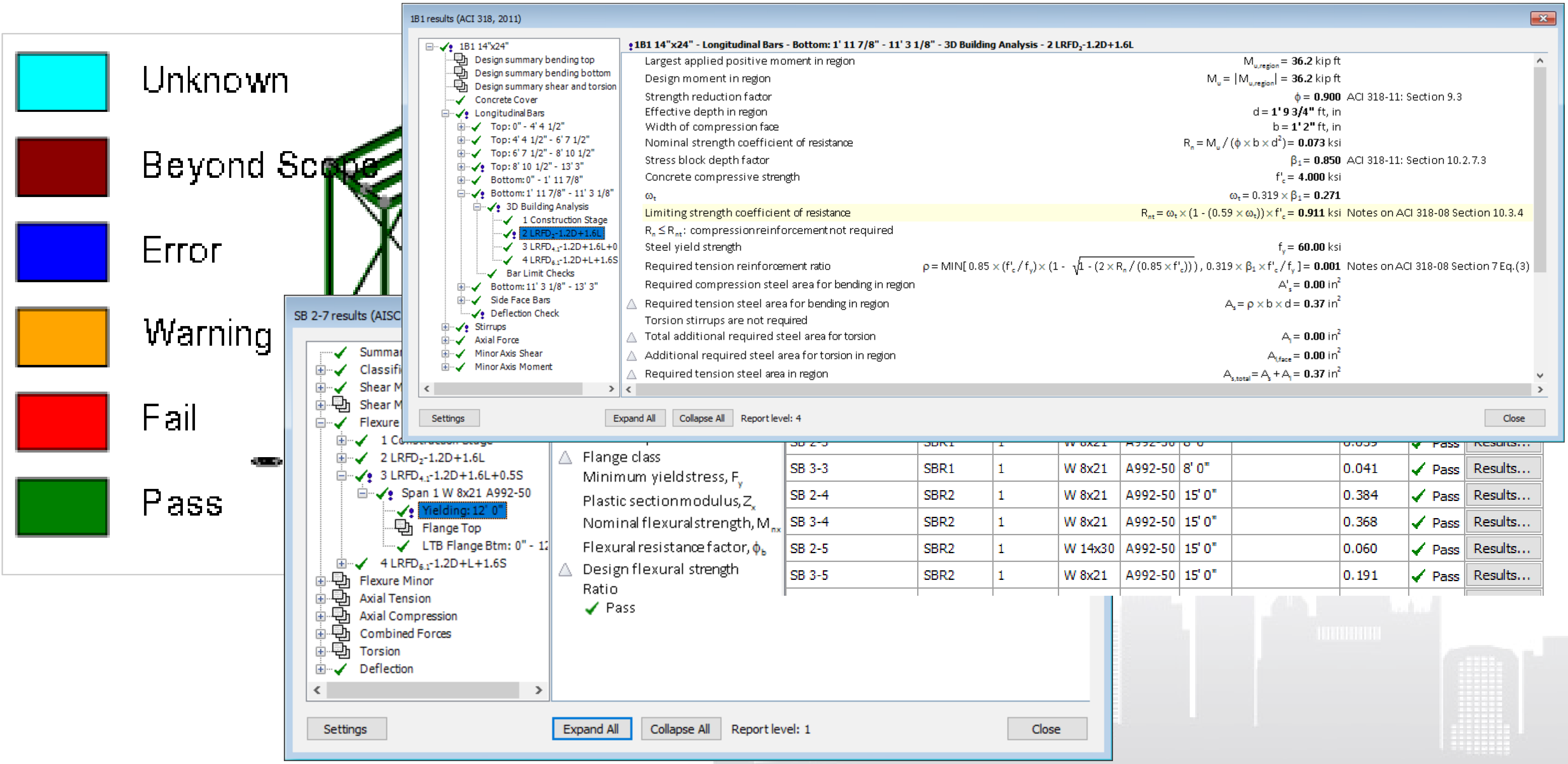
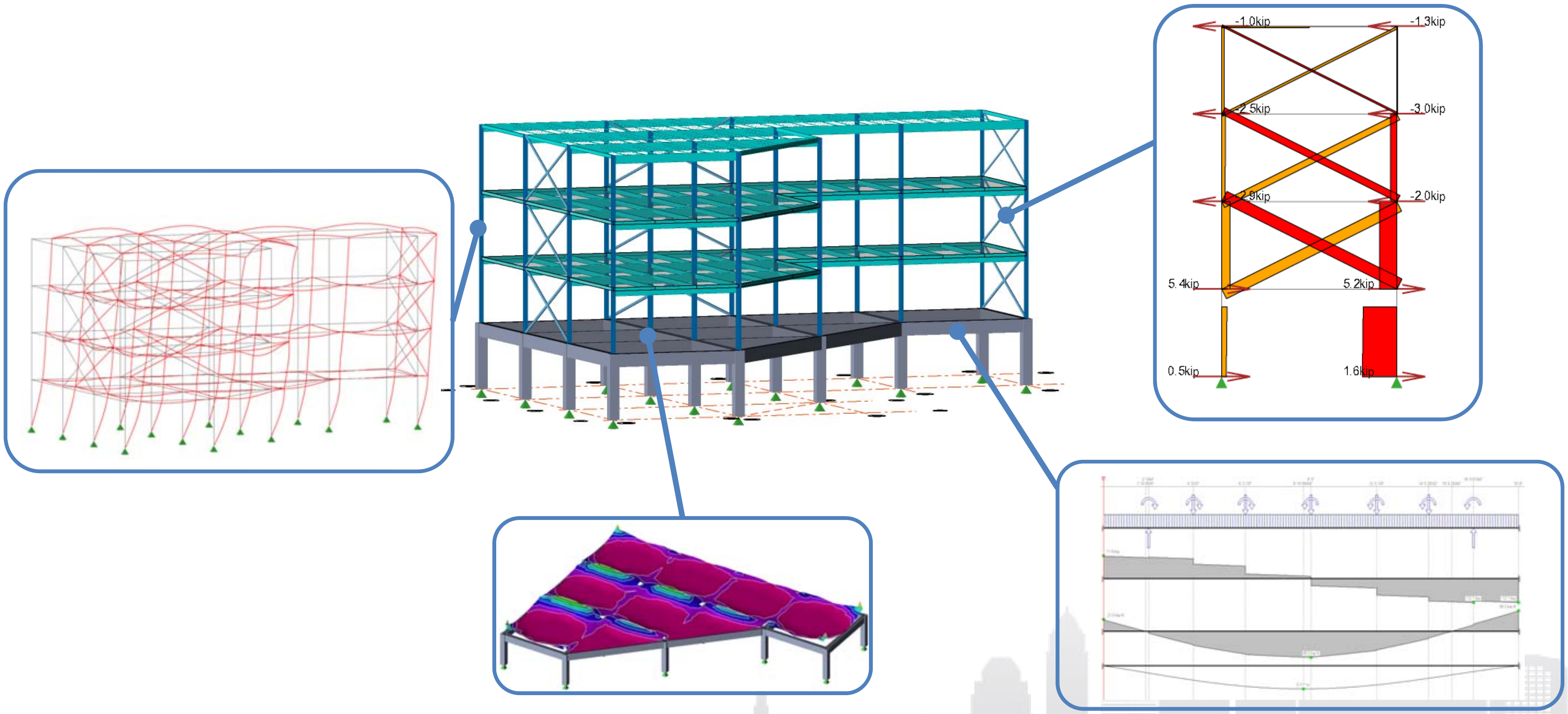
Design Confidently- Transparency in design



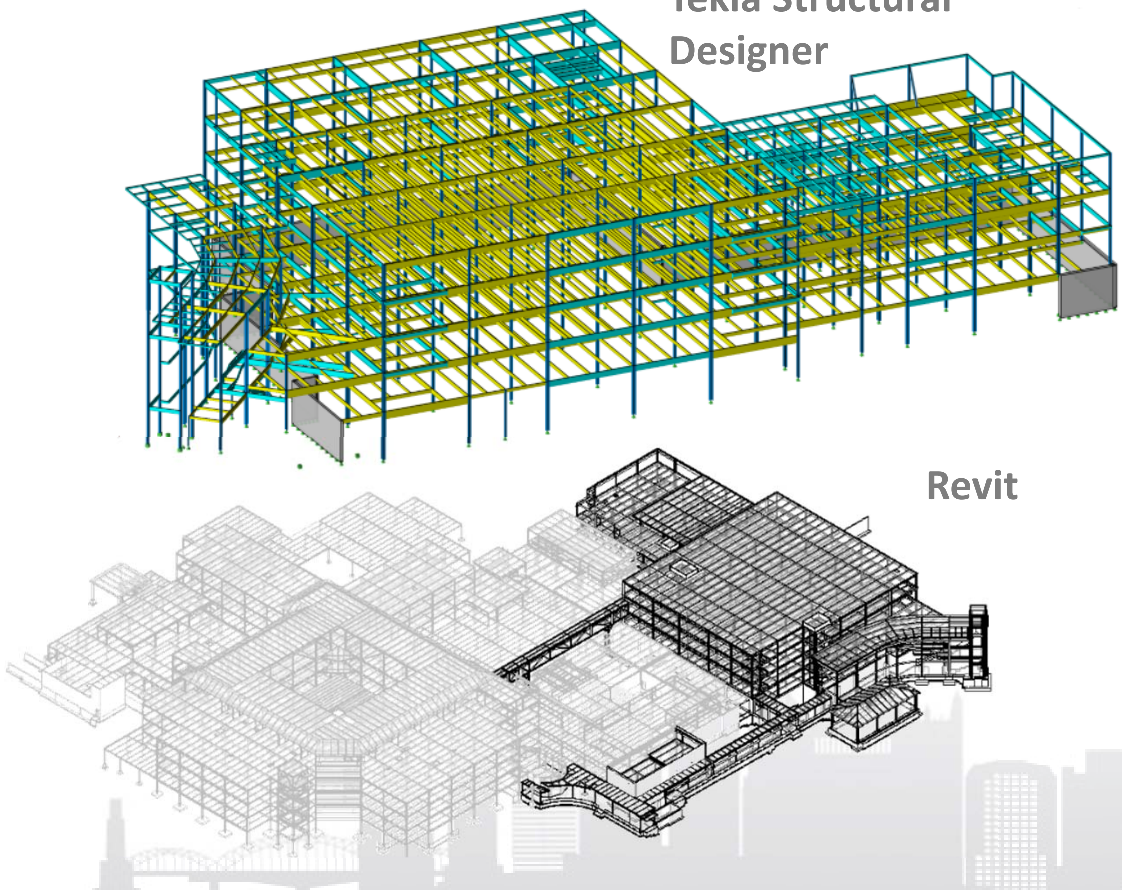
Review Confidently: Graphical results – model, level, individual



Tekla Structural Designer- Moving structural engineering forward

"The TSD to Revit link has been a significant timesaver between engineer and technician. Another benefit we have found is the certainty that our analytical model is identical to our Revit model in plan geometry and sizing."
~Daniel Kilbert, P.E., LEED AP

GRAEF



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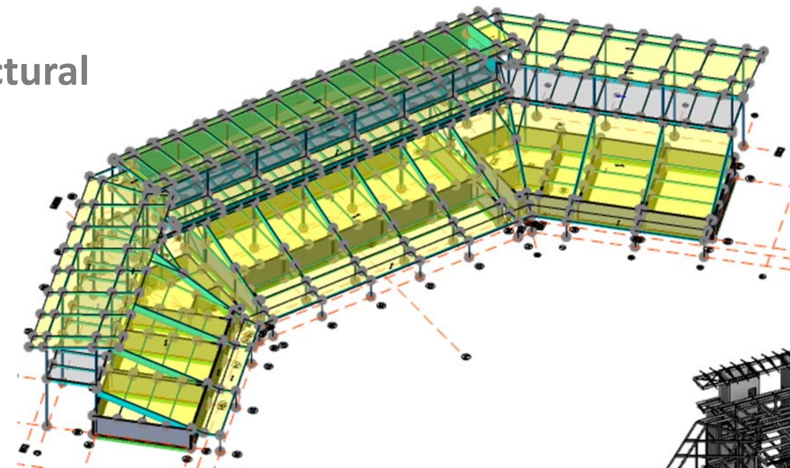
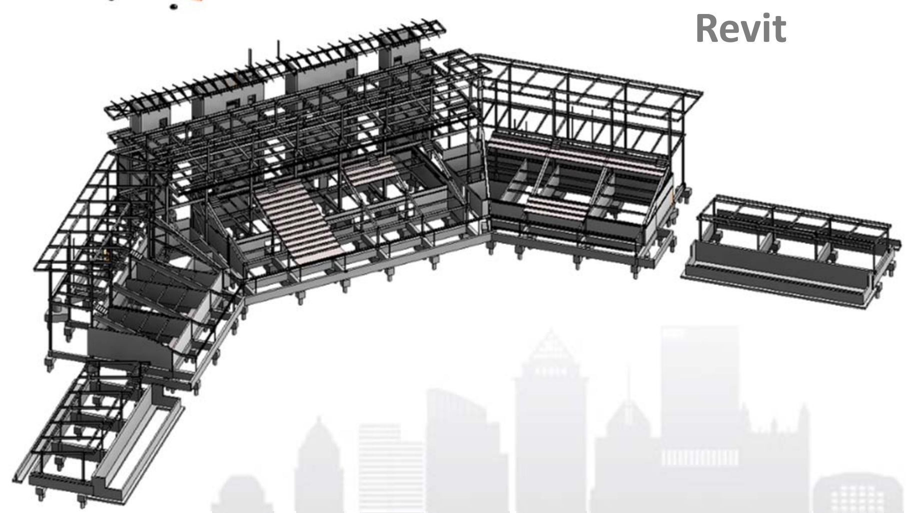
Tekla Structural Designer- moving the industry forward

Tekla Structural Designer



Jimmy John's Field
Utica, MI

Revit



"This is the reason we switched from RAM to TSD"
~Steve Murray, P.E.

SLAM
The S/L/A/M Collaborative

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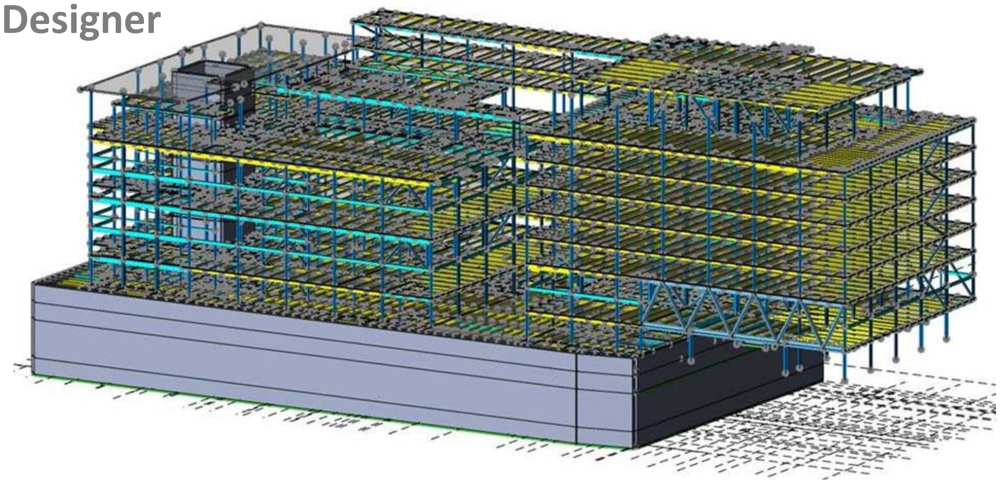
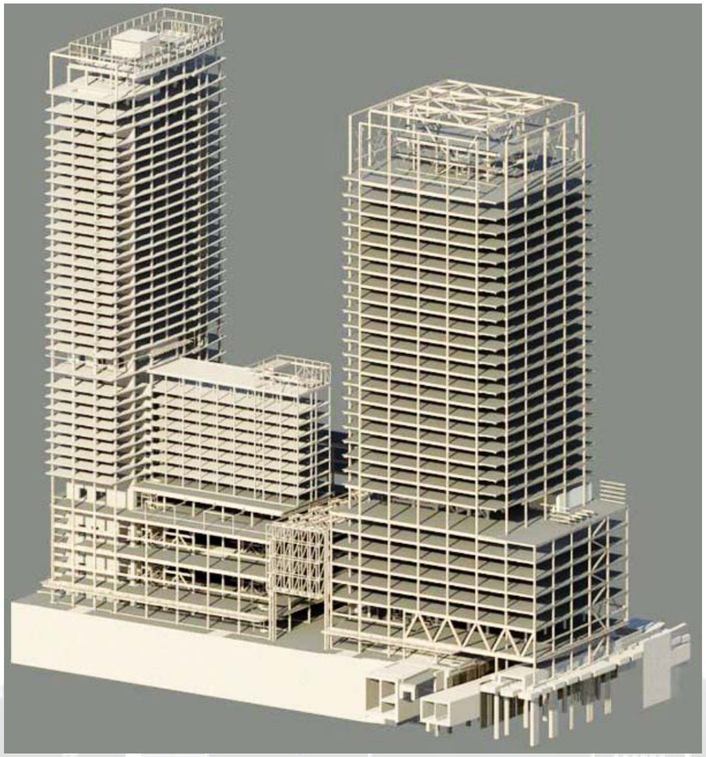
Tekla Structural Designer- moving the industry forward

The Hub on Causeway
Boston, MA

Tekla Structural Designer

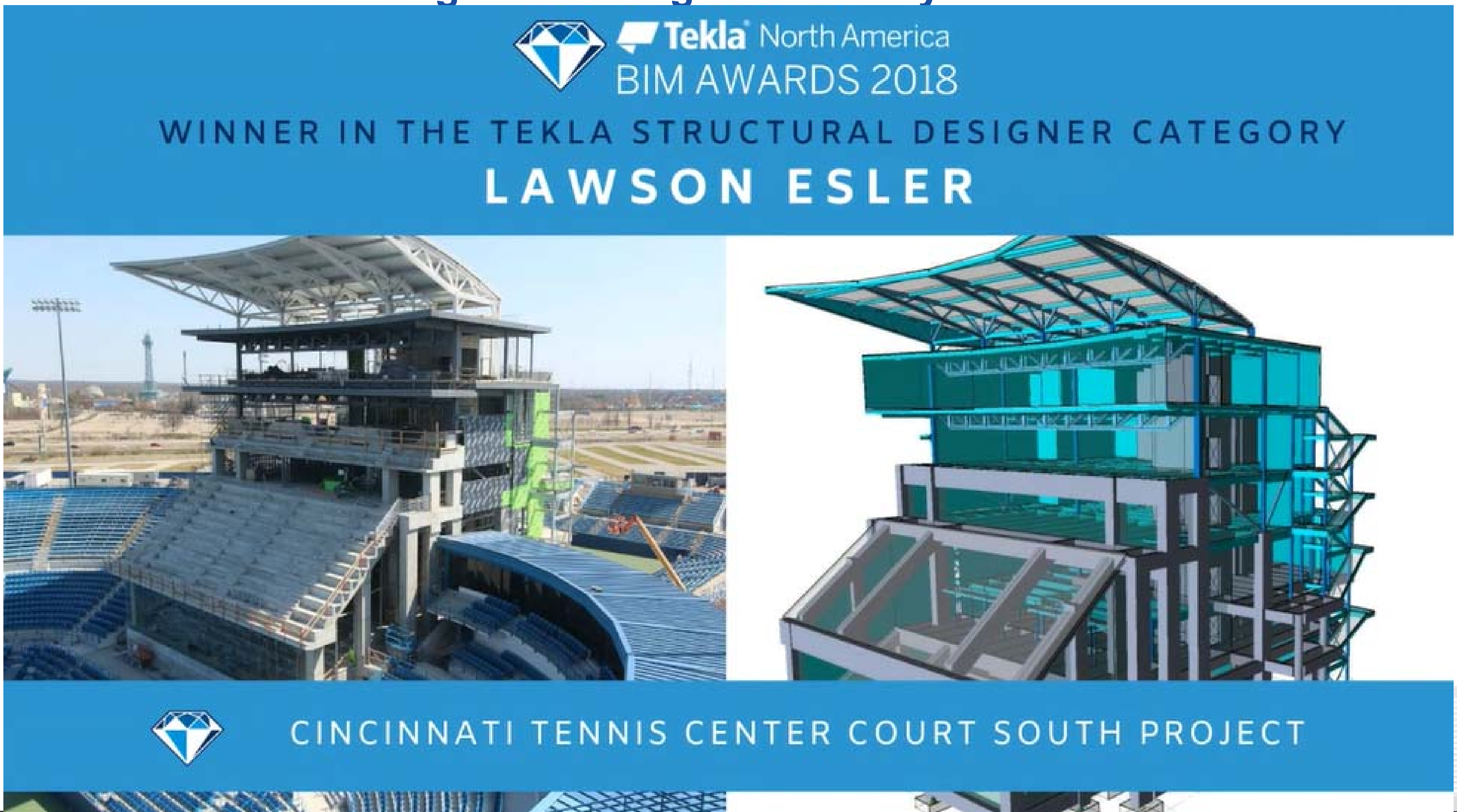


Revit



Courtesy of LeMessurier.

Tekla Structural Designer- moving the industry forward



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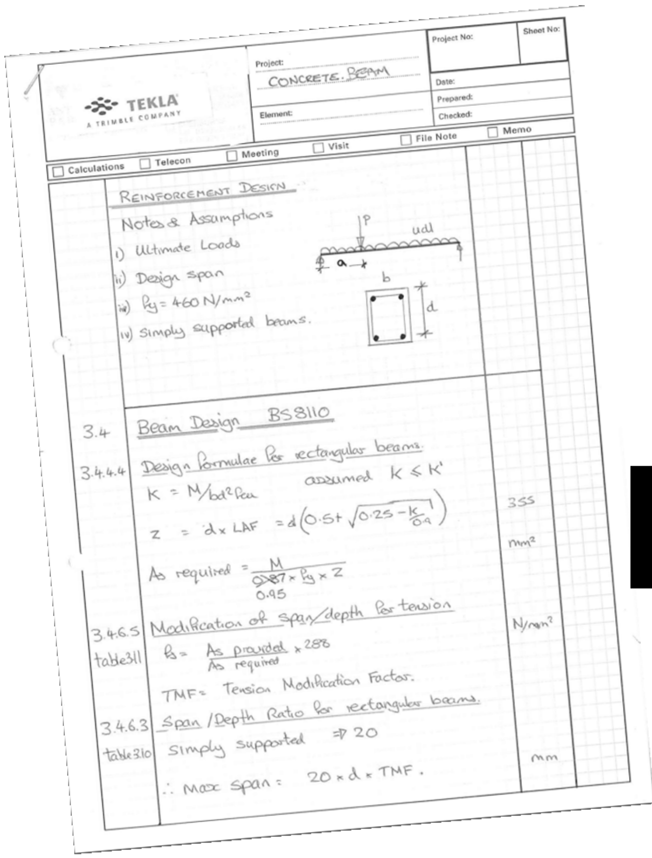
Introducing Trimble's Calculation Suite

T *he*
E *ngineer's*
D *ocument &*
D *esign*
S *ystem*

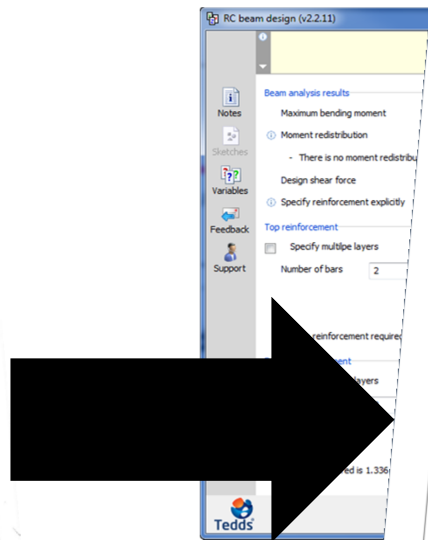
2019

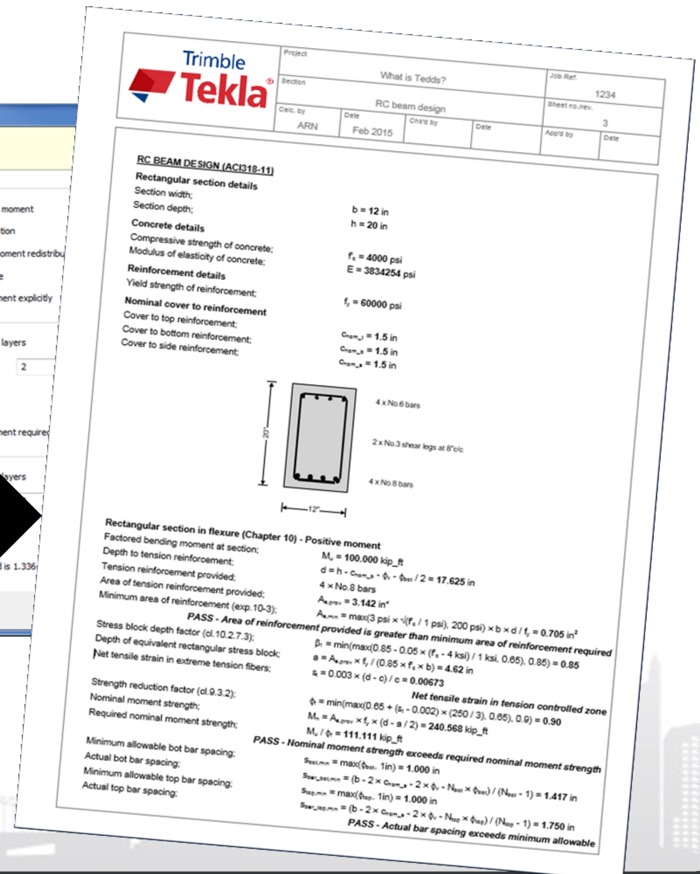
Professional Documents- By Design


Project: CONCRETE BEAM
Element:
Project No:
Sheet No:
Date:
Prepared:
Checked:
TEKLA A TRIMBLE COMPANY
Calculations | Telecon | Meeting | Visit | File Note | Memo

REINFORCEMENT DESIGN
Notes & Assumptions
i) Ultimate Loads
ii) Design span
iii) fy = 460 N/mm²
iv) Simply supported beams.

3.4 Beam Design BS8110
3.4.4.4 Design formulae for rectangular beams.
K = M/bd²fcu assumed K ≤ K'
z = d x LAF = d(0.5 + √(0.25 − K/0.9))
As required = M / (0.87 x fy x z)
3.4.6.5 table3.11 Modification of span/depth for tension
fs = As provided / As required x 288
TMF = Tension Modification Factor.
3.4.6.3 table3.10 Span/Depth Ratio for rectangular beams.
Simply supported ⇒ 20
∴ Max span = 20 x d x TMF.




Trimble Tekla
Project: What is Tedds?
Job Ref. 1234
Section: RC beam design
Sheet no./rev. 3
Calc. by ARN | Date Feb 2015 | Chk'd by | Date | App'd by | Date

RC BEAM DESIGN (ACI318-11)

Rectangular section details
Section width; b = 12 in
Section depth; h = 20 in

Concrete details
Compressive strength of concrete; f'c = 4000 psi
Modulus of elasticity of concrete; E = 3834254 psi

Reinforcement details
Yield strength of reinforcement; fy = 60000 psi

Nominal cover to reinforcement
Cover to top reinforcement; cnom_t = 1.5 in
Cover to bottom reinforcement; cnom_b = 1.5 in
Cover to side reinforcement; cnom_s = 1.5 in

4 x No.6 bars
2 x No.3 shear legs at 8"c/c
4 x No.8 bars

Rectangular section in flexure (Chapter 10) - Positive moment
Factored bending moment at section; Mu = 100.000 kip_ft
Depth to tension reinforcement; d = h - cnom_b - φv - φbot / 2 = 17.625 in
Tension reinforcement provided; 4 x No.8 bars
Area of tension reinforcement provided; As,prov = 3.142 in²
Minimum area of reinforcement (exp.10-3); As,min = max(3 psi x √(f'c / 1 psi), 200 psi) x b x d / fy = 0.705 in²
PASS - Area of reinforcement provided is greater than minimum area of reinforcement required
Stress block depth factor (cl.10.2.7.3); β1 = min(max(0.85 - 0.05 x (f'c - 4 ksi) / 1 ksi, 0.65), 0.85) = 0.85
Depth of equivalent rectangular stress block; a = As,prov x fy / (0.85 x f'c x b) = 4.62 in
Net tensile strain in extreme tension fibers; εt = 0.003 x (d - c) / c = 0.00673
Net tensile strain in tension controlled zone
Strength reduction factor (cl.9.3.2); φf = min(max(0.65 + (εt - 0.002) x (250 / 3), 0.65), 0.9) = 0.90
Nominal moment strength; Mn = As,prov x fy x (d - a / 2) = 240.568 kip_ft
Required nominal moment strength; Mu / φf = 111.111 kip_ft
PASS - Nominal moment strength exceeds required nominal moment strength
Minimum allowable bot bar spacing; sbot,min = max(φbot, 1in) = 1.000 in
Actual bot bar spacing; sbot,act,min = (b - 2 x cnom_s - 2 x φv - Nbot x φbot) / (Nbot - 1) = 1.417 in
Minimum allowable top bar spacing; stop,min = max(φtop, 1in) = 1.000 in
Actual top bar spacing; stop,act,min = (b - 2 x cnom_s - 2 x φv - Ntop x φtop) / (Ntop - 1) = 1.750 in
PASS - Actual bar spacing exceeds minimum allowable

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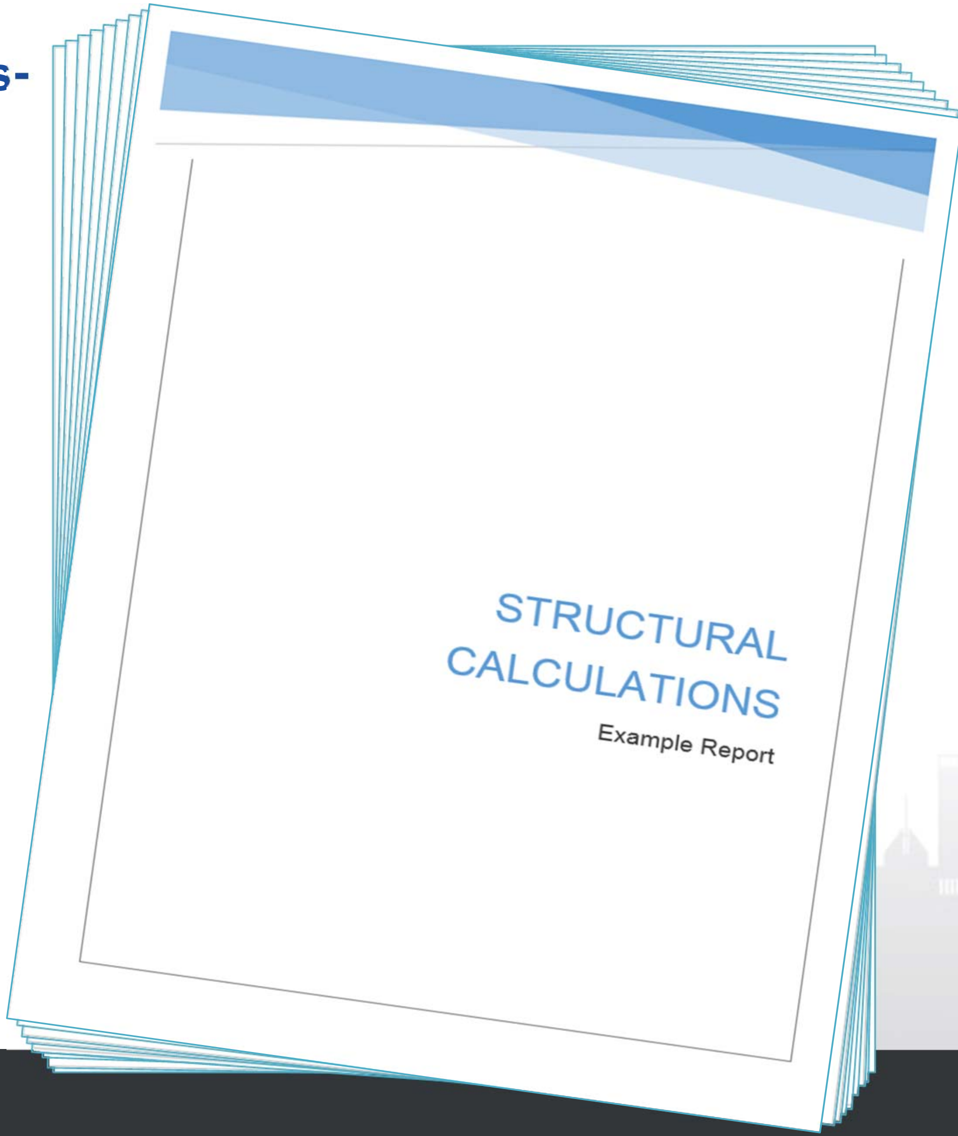
Professional Documents- Easy with TEDDS



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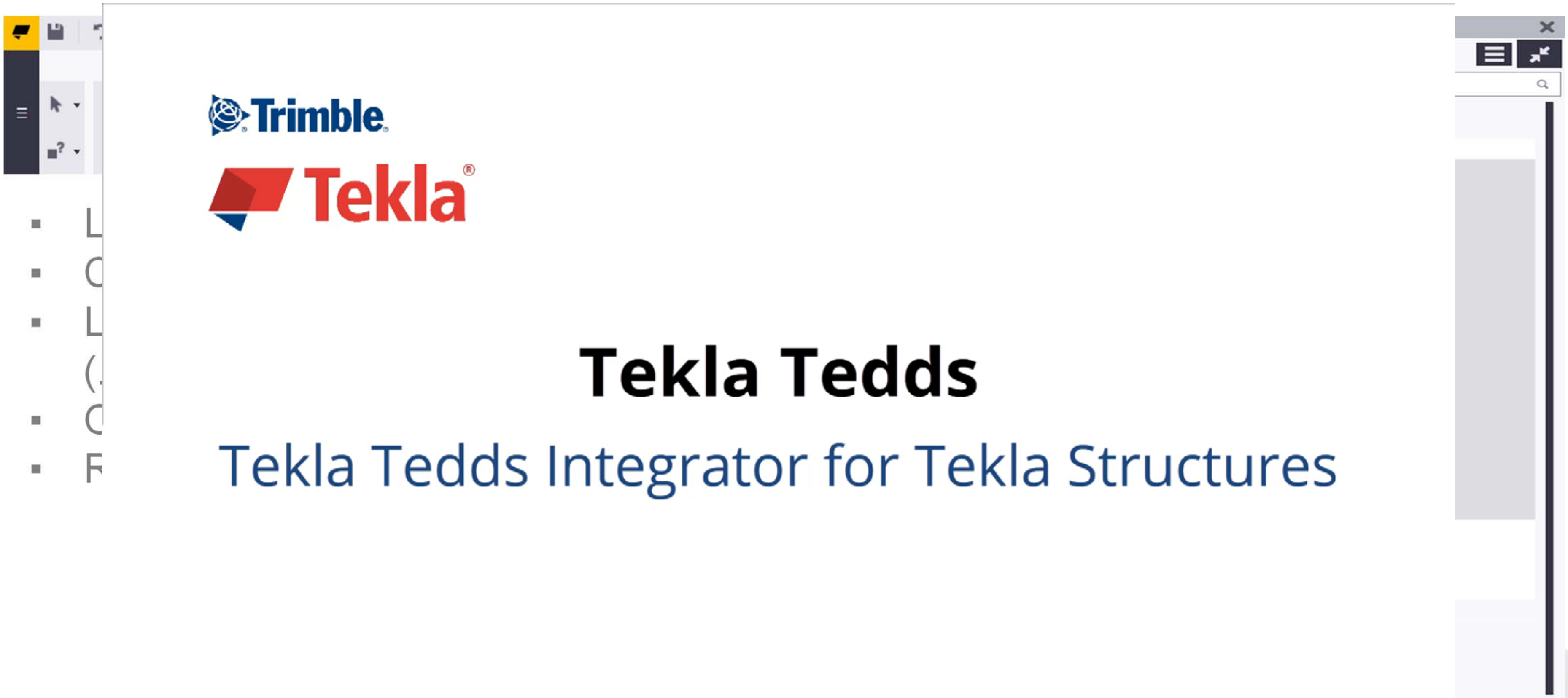
Let's take a look!



Let’s take a look!

Product Demonstration