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Copyright Materials

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Course Description

Where Did That Force Come From?

October 23, 2014

This presentation addresses the derivation of design forces for braced frame beams and their connections for various loading conditions. In particular, the live webinar focuses on the combination of frame-design and diaphragm-design forces. The presentation will give a methodology for determining consistent sets of design forces based on increasing levels of complexity. Emphasis will be placed on clear free body diagrams and consistent sets of forces corresponding to clear and understandable load conditions for the frame.

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Learning Objectives

- Become familiar with the design challenges when combining frame and diaphragm forces.
- Gain an understanding of the anticipated behavior, particularly for seismic systems.
- Learn and understand how to reconcile design forces in braced-frame connections.
- Gain an understanding of a practical methodology for determining consistent sets of design forces.

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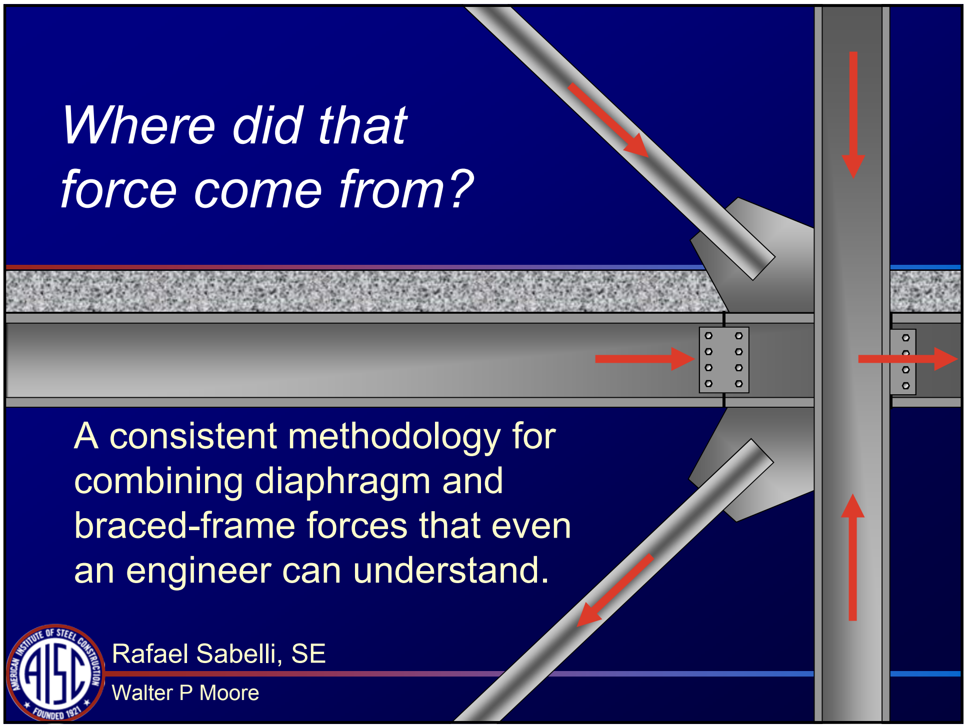
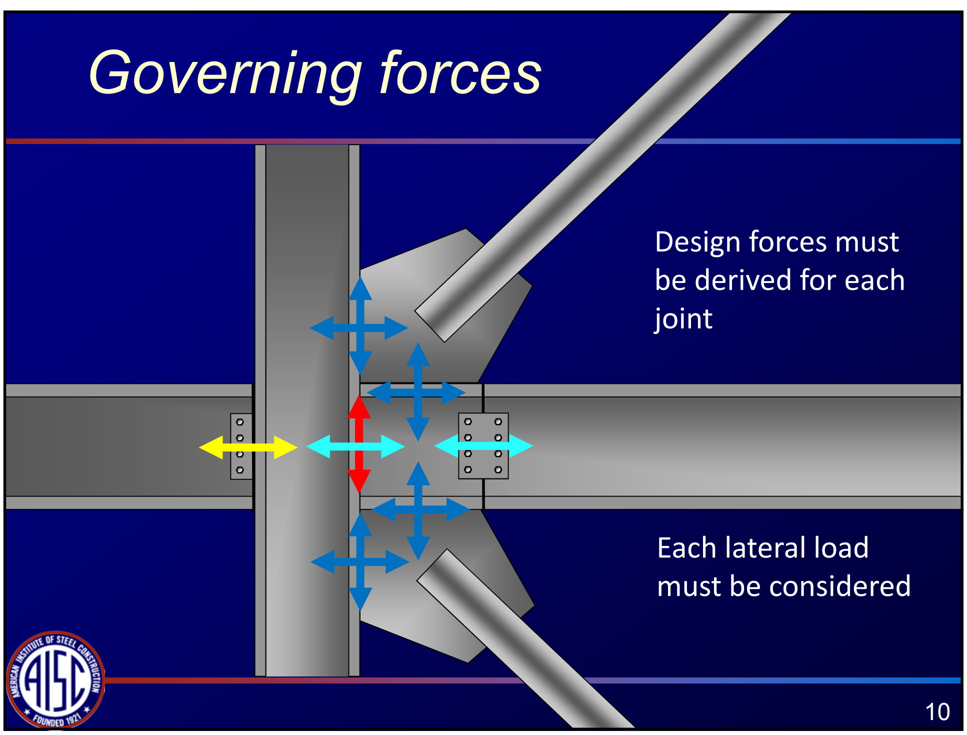
Today's AISC Live Webinar

Where Did That Force Come From? Combining Diaphragm and Braced Frame Forces

written and presented by
Rafael Sabelli, S.E.
Director of Seismic Design, Walter P. Moore and Associates, San Francisco, CA.


Where did that
force come from?
A consistent methodology for
combining diaphragm and
braced-frame forces that even
an engineer can understand.
Rafael Sabelli, SE
Walter P Moore


Governing forces
Design forces must
be derived for each
joint
Each lateral load
must be considered
10

Types of forces

- Applied load patterns of the design base shear
  - Wind
  - Seismic
- Diaphragm accelerations F_p
  - Seismic
  - Inconsistent with design base shear
- Member yielding capacity & system mechanism
  - Seismic
  - Inconsistent with
    - Design base shear
    - F_p forces

Note the color coding!

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Two definitions & an important question

Analysis:

Application of physical laws and mathematics to compute the deformations, internal forces, and stresses of structures resulting from the application of loads.

Analysis:

Derivation of forces to permit the design of members and connections resulting in a structure adequate for the anticipated loads.

What are the forces in the braces when the F_p force is in the diaphragm?

"Zero" would seem to be a poor answer.

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Outline

- Wind
- Seismic
  - *R*=3
    - SDC B
    - SDC C
      - *Apply Ω_o at collectors*
- Numerical example
  - R3BF
- *R*=3.25
  - OCBF
- *R*>3.25
  - SCBF
  - EBF
  - BRBF
- Post-buckled SCBF
- Numerical example
  - SCBF

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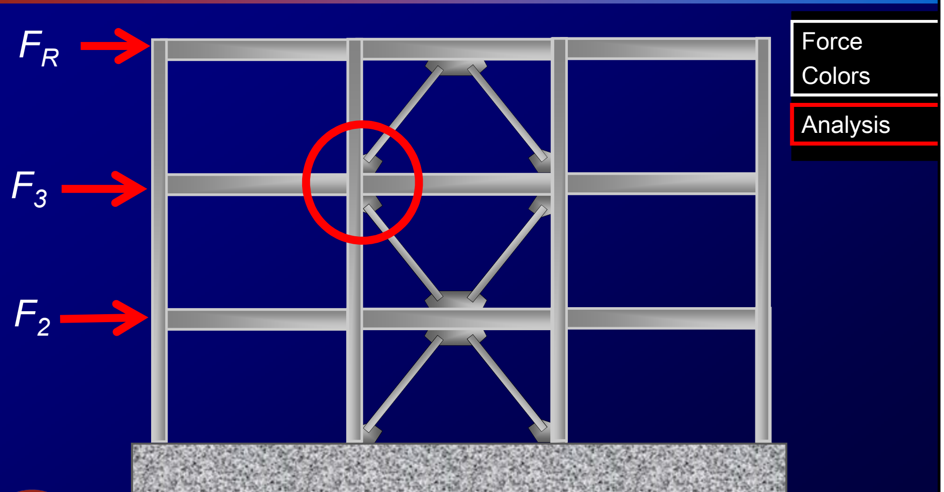
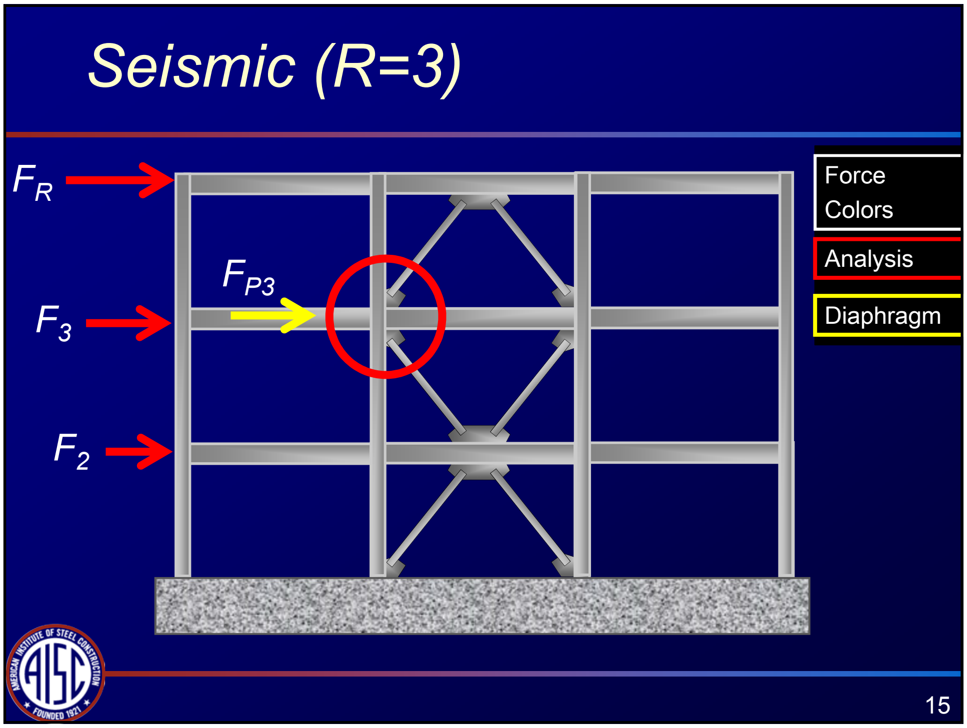
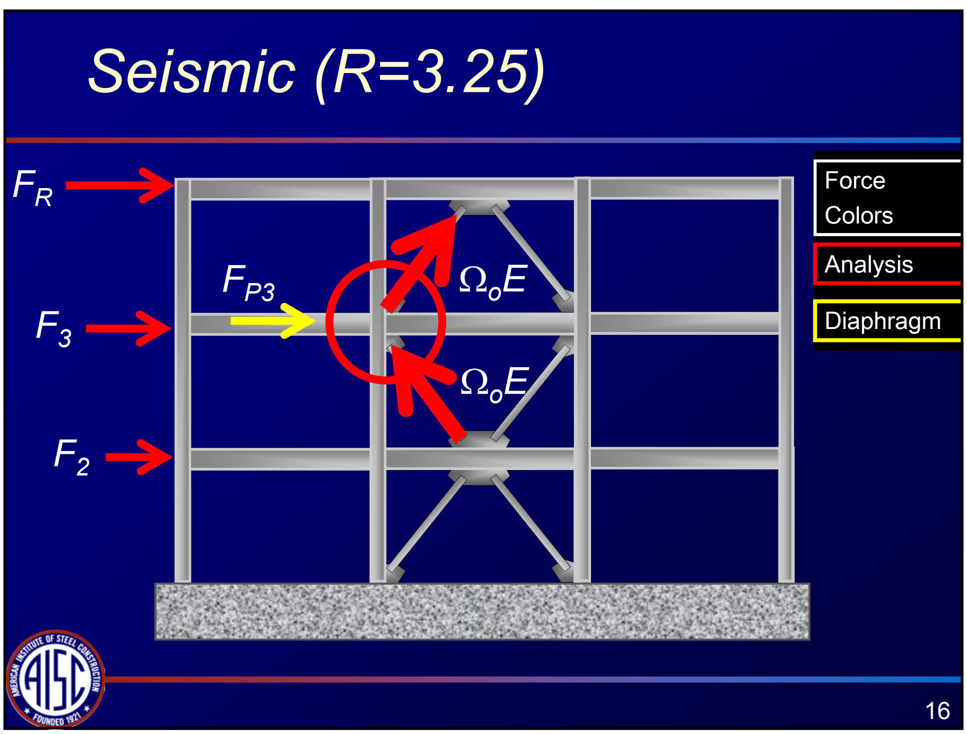
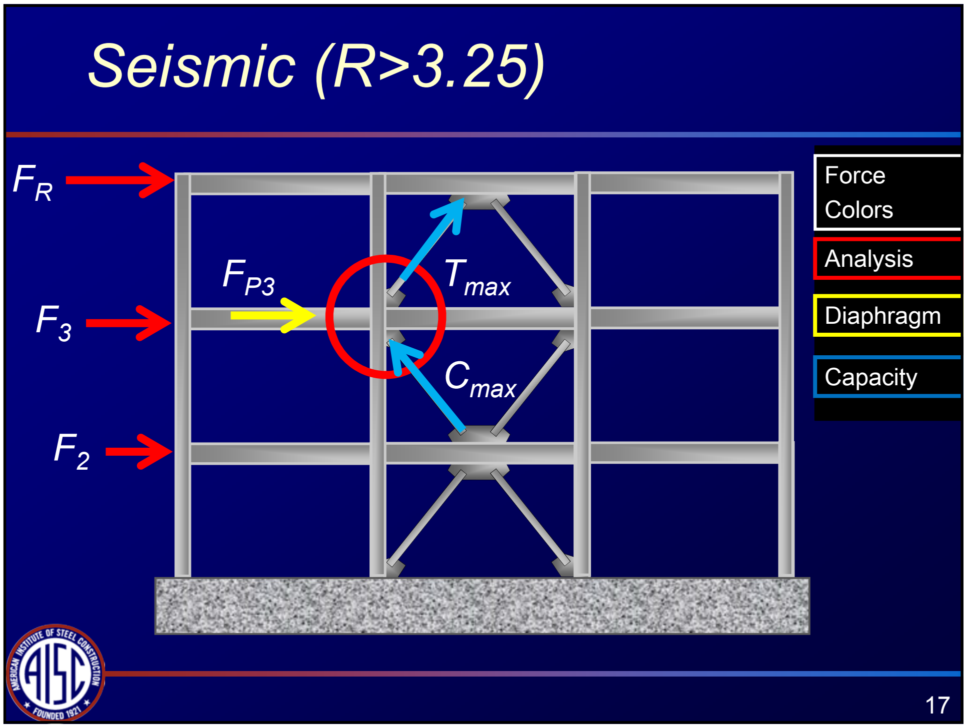
Wind

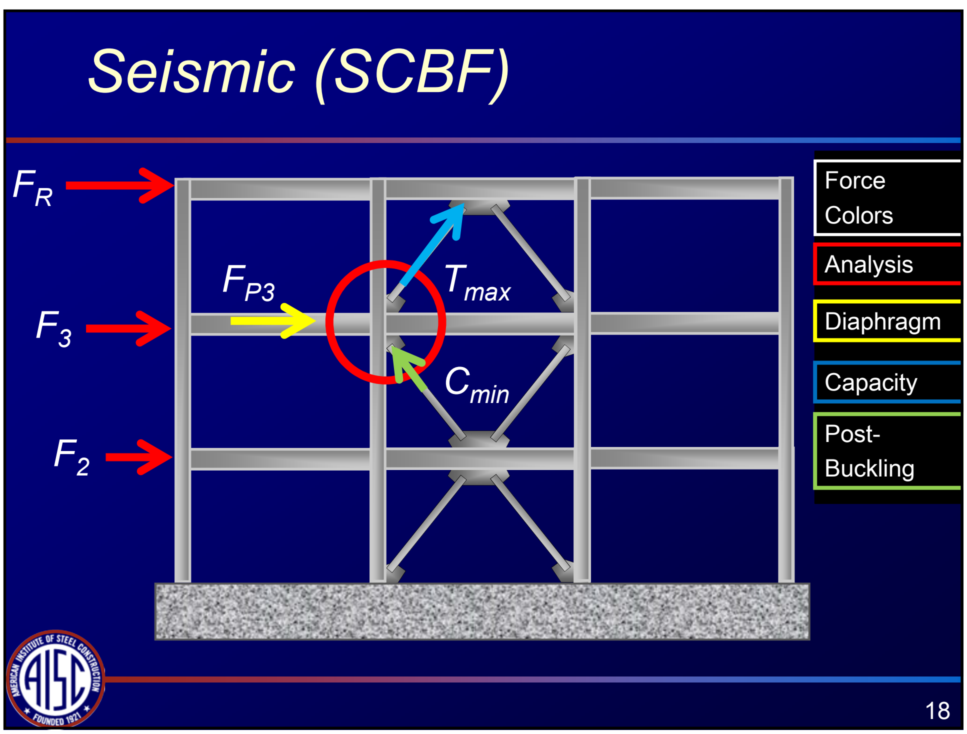


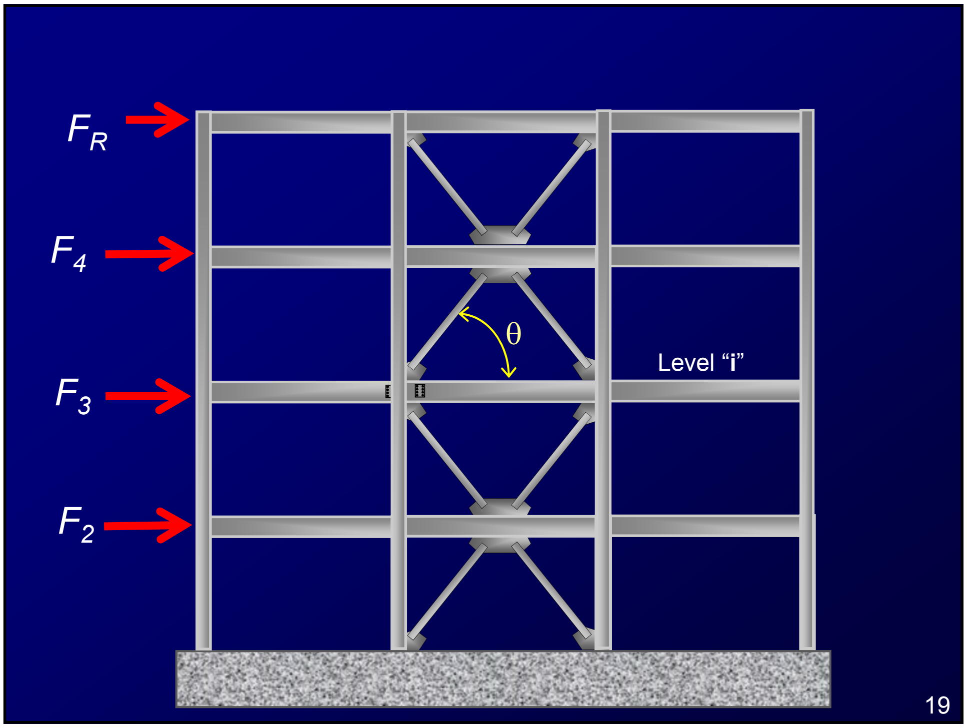
14

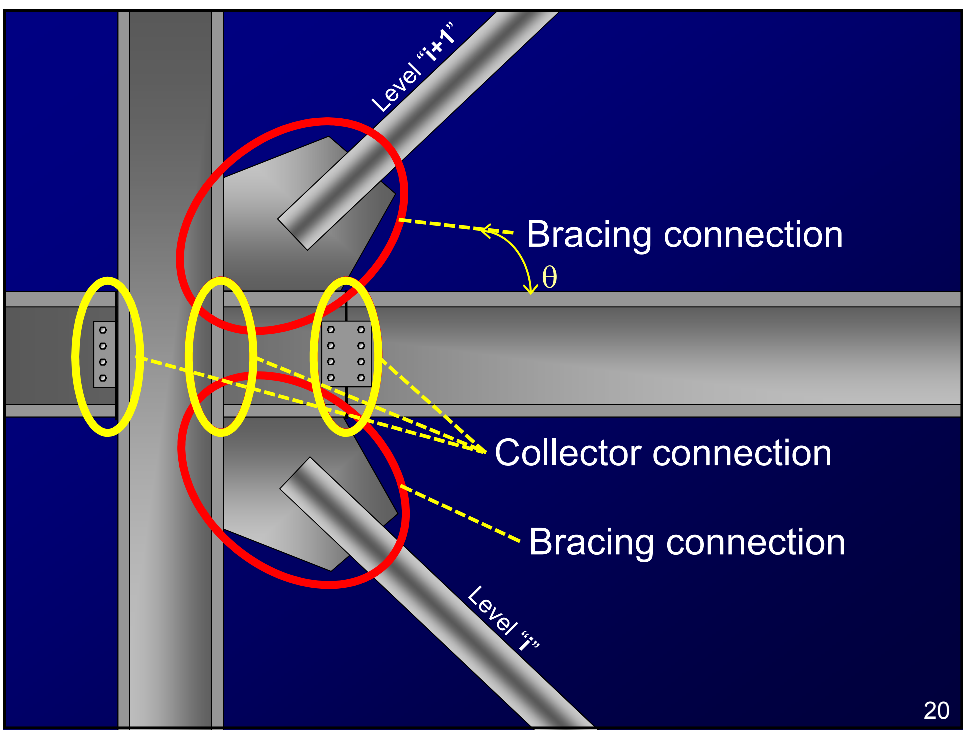

Seismic (R=3)
F_R
F_{P3}
F_3
F_2
Force Colors
Analysis
Diaphragm
15


Seismic (R=3.25)
F_R
F_{P3}
$\Omega_o E$
F_3
$\Omega_o E$
F_2
Force Colors
Analysis
Diaphragm
16


Seismic (R>3.25)
F_R
F_{P3}
F_3
F_2
T_{max}
C_{max}
Force Colors
Analysis
Diaphragm
Capacity
17


Seismic (SCBF)
F_R
F_{P3}
F_3
F_2
T_{max}
C_{min}
Force Colors
Analysis
Diaphragm
Capacity
Post-Buckling
18


F_R
F_4
F_3
F_2
θ
Level "i"
19


Level "i+1"
Bracing connection
θ
Collector connection
Bracing connection
Level "i"
20

Part I:

Wind

Wind

- Each vertical force distribution is sufficient
  - Can be considered separately
  - Member forces statically balanced
- Direction of load is reversible
  - Braces change from tension to compression
  - Gravity shear
    - Adds to shear from braces
    - Counteracts shear from braces
- Gusset Analysis
  - Uniform Force Method
    - Variants

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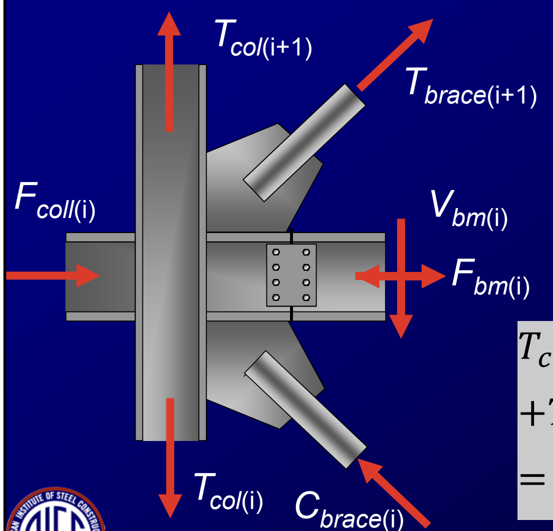
Wind



$$F_{coll(i)} + F_{bm(i)} + T_{brace(i+1)} \cos\theta_{(i+1)} = C_{brace(i)} \cos\theta_i$$

$$T_{col(i+1)} + C_{br(i)} \sin\theta_{(i)} + T_{brace(i+1)} \sin\theta_{(i+1)} = T_{col(i)} + V_{bm(i)}$$

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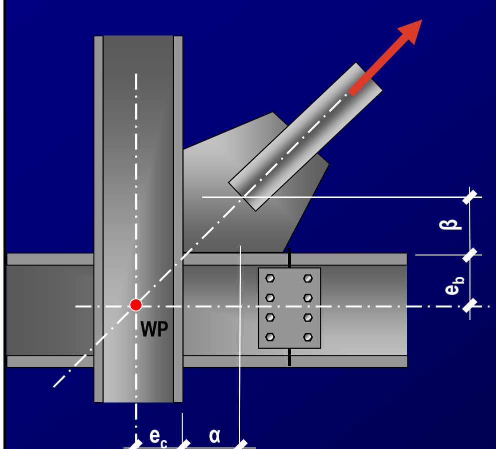
Gusset Analysis



- e_b = ½ beam depth
- e_c = ½ column depth
- α = column flange or web to centroid of gusset-to-beam connection
- β = beam flange or web to centroid of gusset-to-column connection

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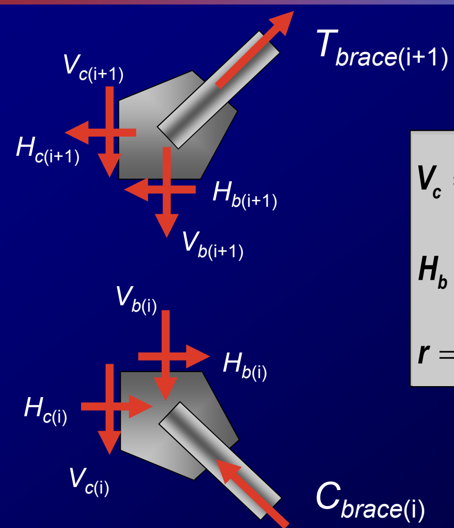
Gusset Analysis



$$V_c = \frac{\beta}{r}P \qquad H_c = \frac{e_c}{r}P$$

$$H_b = \frac{\alpha}{r}P \qquad V_b = \frac{e_b}{r}P$$

$$r = \sqrt{(\alpha + e_c)^2 + (\beta + e_b)^2}$$

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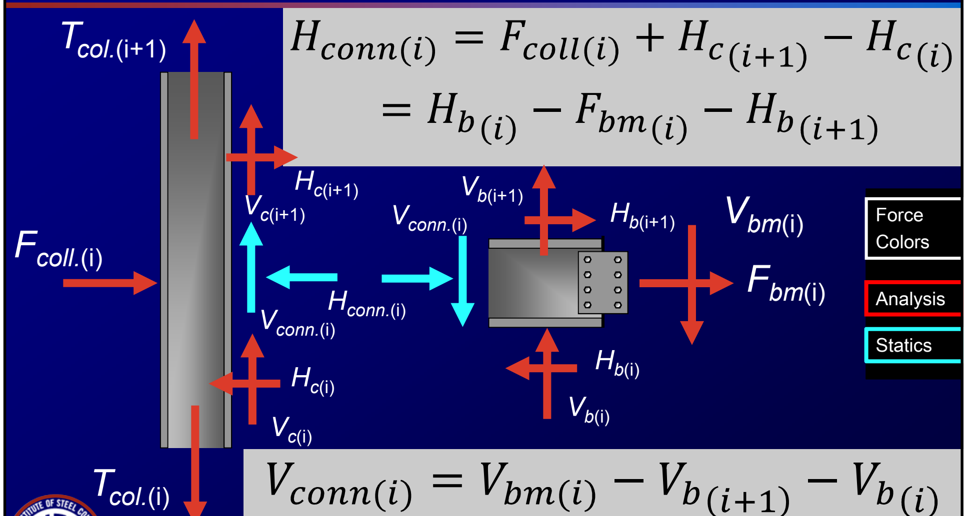
Wind



$$H_{conn(i)} = F_{coll(i)} + H_{c(i+1)} - H_{c(i)}$$

$$= H_{b(i)} - F_{bm(i)} - H_{b(i+1)}$$

$$V_{conn(i)} = V_{bm(i)} - V_{b(i+1)} - V_{b(i)}$$

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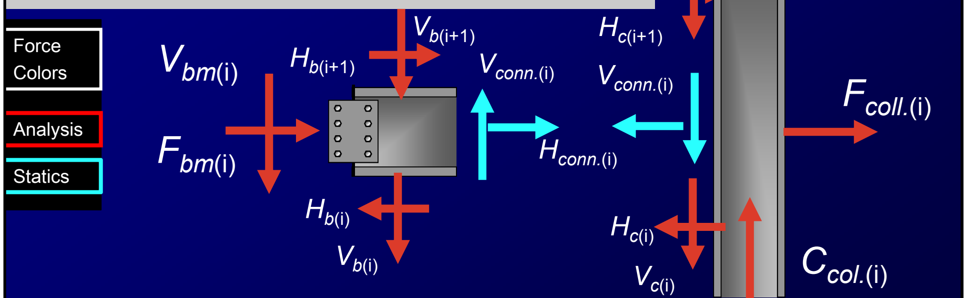
Wind

$$H_{conn(i)} = F_{coll(i)} + H_{c\,(i+1)} - H_{c\,(i)}$$
$$= H_{b\,(i)} - F_{bm\,(i)} - H_{b\,(i+1)}$$



$$V_{conn(i)} = V_{bm(i)} + V_{b\,(i+1)} + V_{b\,(i)}$$

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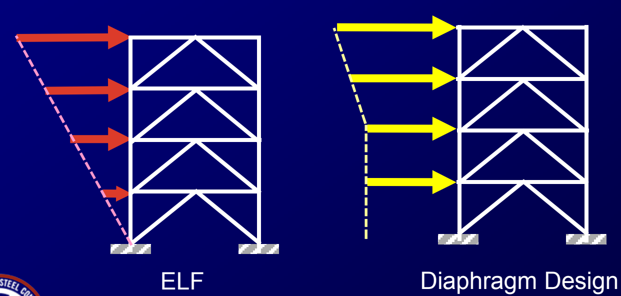
Part II:

Seismic
R=3

Seismic: *R*=3

Vertical force distribution insufficient



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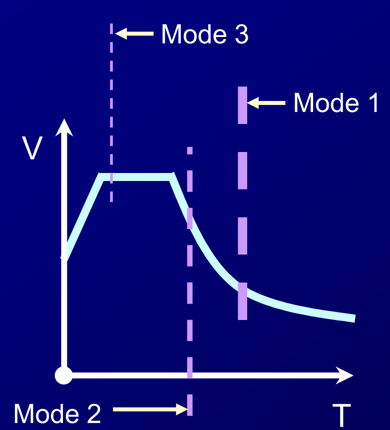
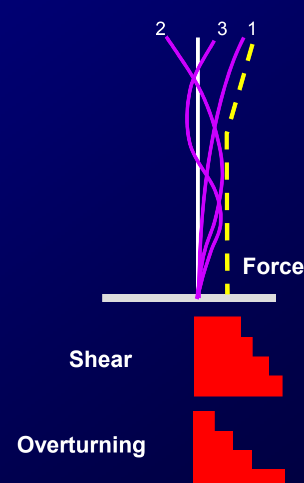
Modal Response





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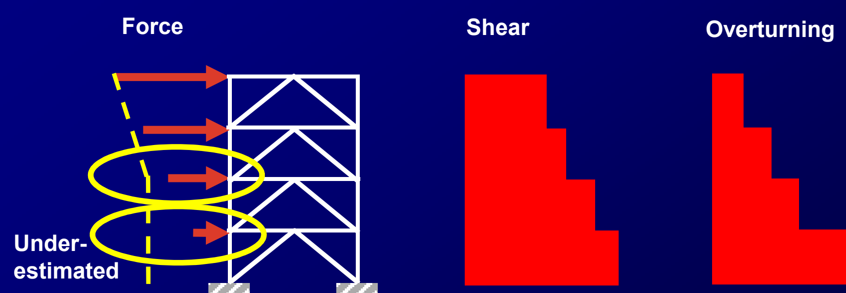
ELF vertical distribution



$$C_{vx} = \frac{w_x h_x^{\,k}}{\sum_{i=1}^{n} w_i h_i^{\,k}}$$

ASCE 7
Eq. 12.8-12

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Diaphragm force coefficients

$F_{pi} \leq 0.4 S_{DS} I w_{px}$

$$F_{px} = \frac{\sum_{i=x}^{n} F_i}{\sum_{i=x}^{n} w_i} w_{px}$$

ASCE 7
Eq. 12.10-1

$F_{pi} \geq 0.2 S_{DS} I w_{px}$

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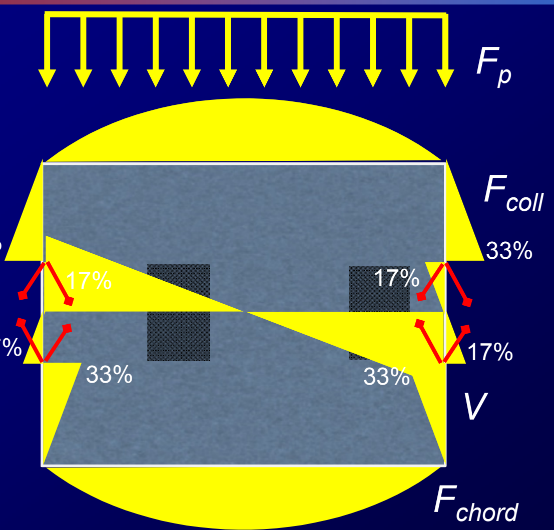
Diaphragm analysis

Just one example of a collector force distribution



There's always a solution in steel

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Seismic: *R*=3

Vertical force distribution insufficient

- Need not abandon static equilibrium
  - Create 2 load cases, each satisfying equilibrium
- Case 1
  - Vertical force distribution
  - Same procedure as wind
    - *Member forces statically balanced*
  - Governs vertical forces at connection
- Case 2
  - Vertical force distribution with F_p instead of F_i
    - → *Adjustment need for static equilibrium*
    - *Apply Ω_o to collectors for SDC C*
  - *May* govern horizontal forces at connection

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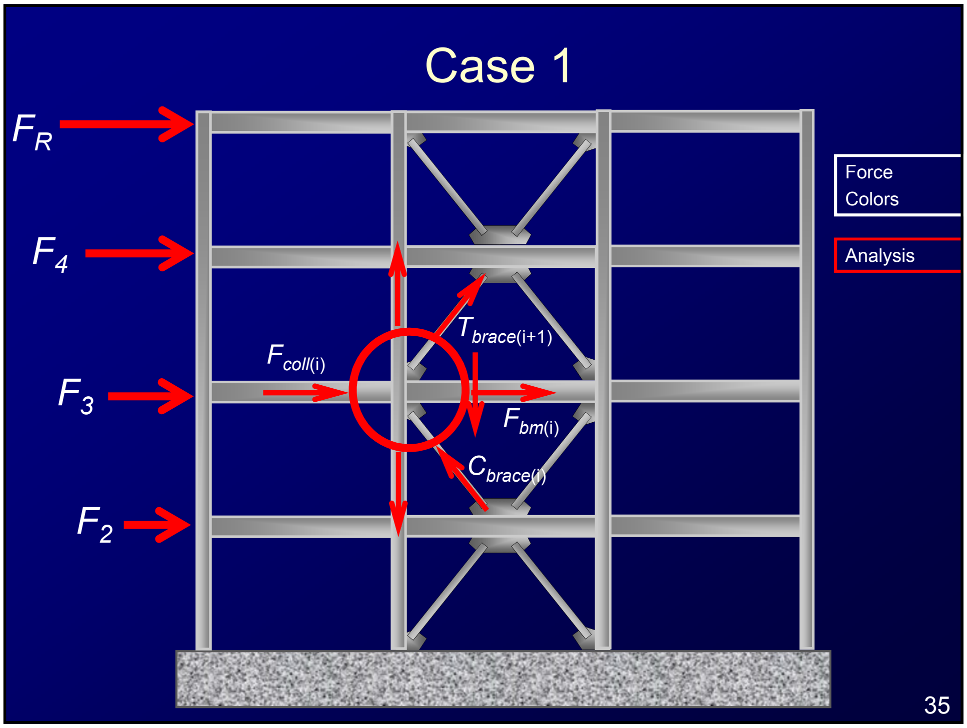
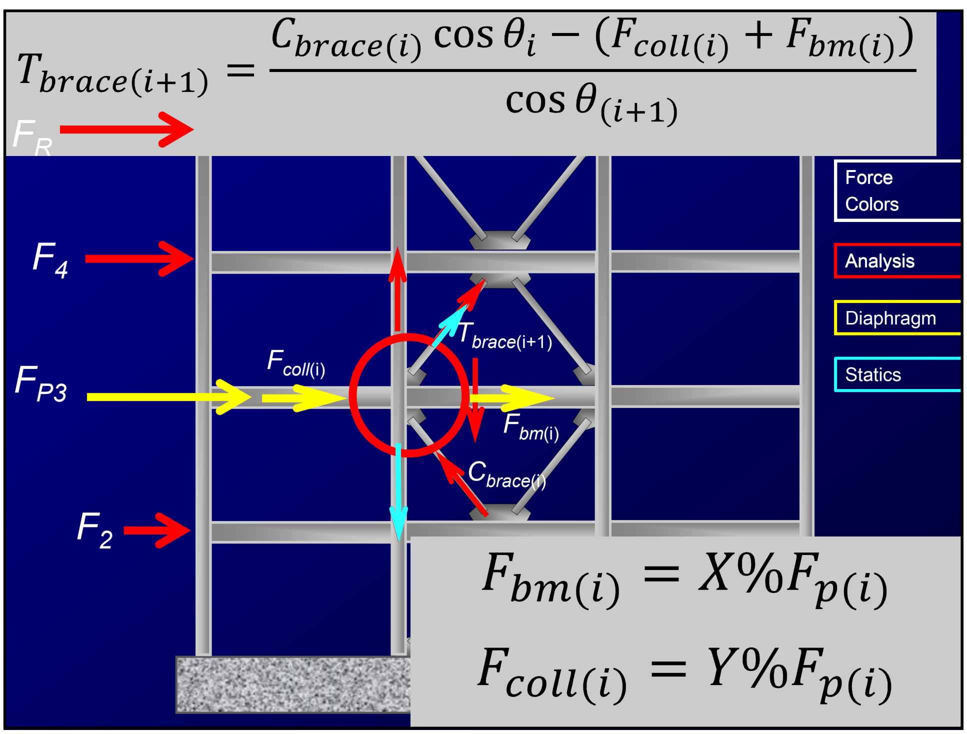
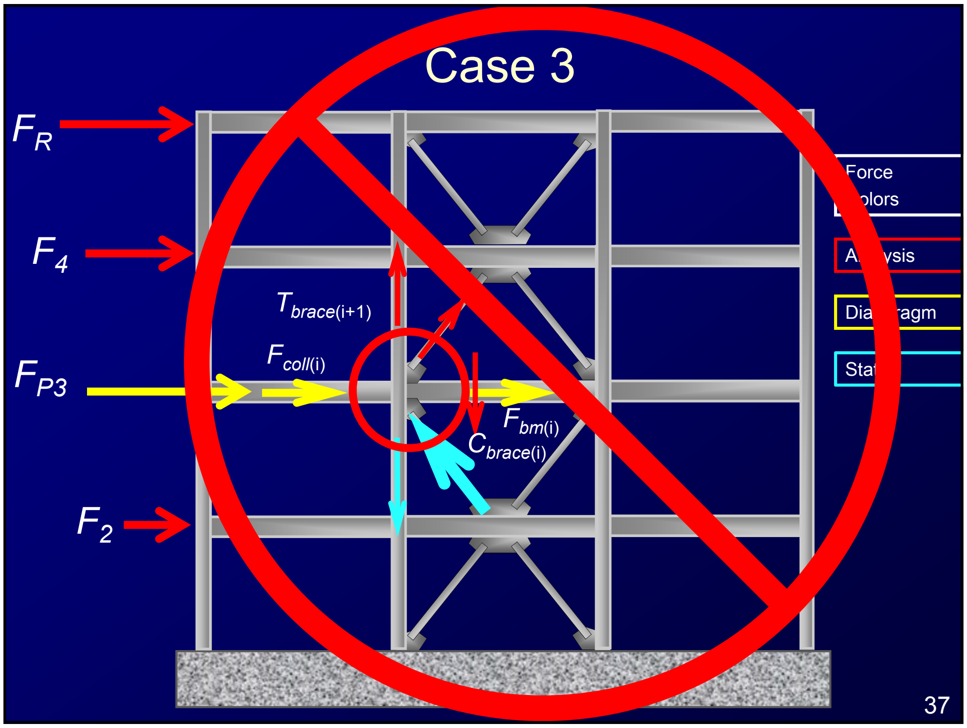

Case 1
F_R
F_4
F_3
F_2
$F_{coll(i)}$
$T_{brace(i+1)}$
$F_{bm(i)}$
$C_{brace(i)}$
Force Colors
Analysis
35


$$T_{brace(i+1)} = \frac{C_{brace(i)} \cos\theta_i - (F_{coll(i)} + F_{bm(i)})}{\cos\theta_{(i+1)}}$$
F_R
F_4
F_{P3}
F_2
$F_{coll(i)}$
$T_{brace(i+1)}$
$F_{bm(i)}$
$C_{brace(i)}$
Force Colors
Analysis
Diaphragm
Statics
$$F_{bm(i)} = X\%F_{p(i)}$$
$$F_{coll(i)} = Y\%F_{p(i)}$$



Seismic: *R*=3

Footnote: Modal Response Spectrum Analysis →

- Member forces lose signs
  - SRSS or CQC combination
  - Assume direction
- Member forces not statically balanced
  - Case 1b
    - *Adjust collector forces*
  - Case 2b
    - *Adjust brace forces above*

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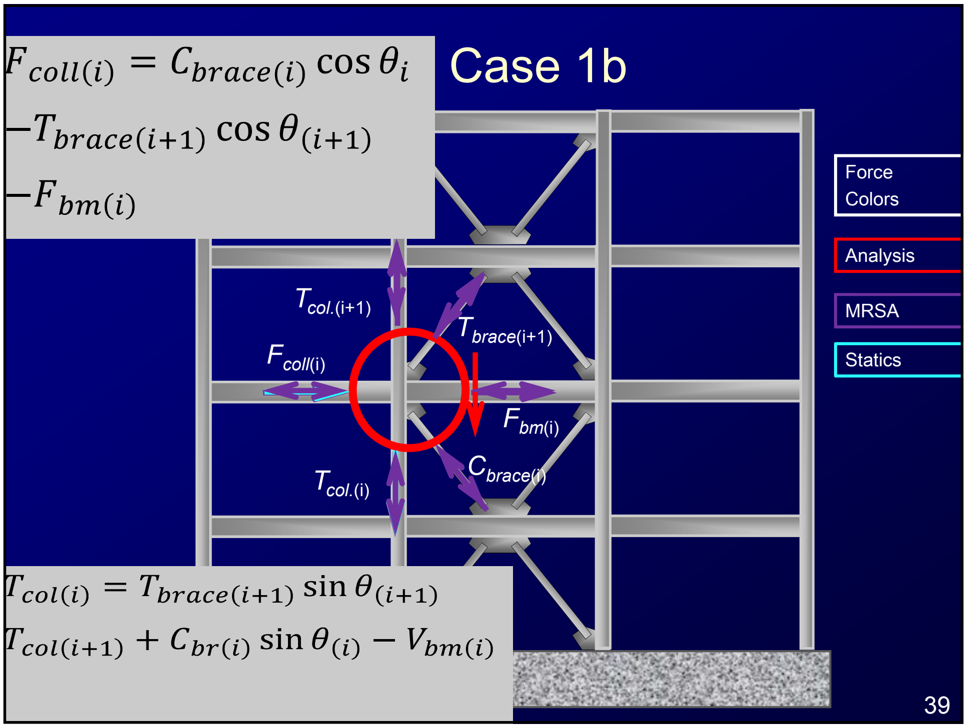

Modal response spectrum analysis

- Collectors
  - Model collectors
    - Modal combination gives forces
  - Use “Section Cuts” to obtain difference ($V_i - V_{i+1}$) for each mode
    - Modal combination gives forces
  - Do not use the difference between V_{i+1} and V_i after modal combination

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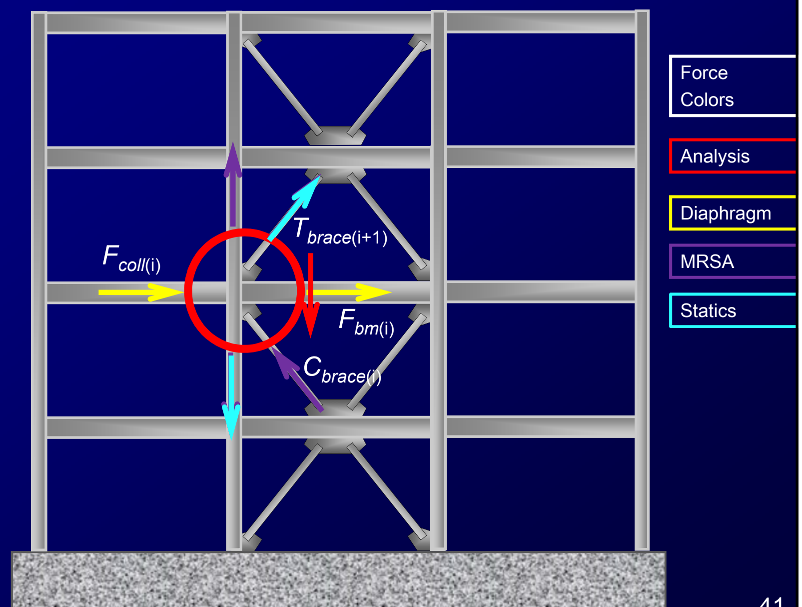
Case 2b



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A word about Ω_o…

Omegification

- Do your analysis
- Combine forces
  - Diaphragm collector forces
  - Transfer forces
  - Braced-frame beam forces
- Omegify collector and collector connection forces
  - Ω_o is not limited to F_p forces
  - Ω_o is applied to critical, non-ductile (or not-very-ductile) elements
  - Braced-frame beam is a collector
- Wait until the end to combine with gravity loads

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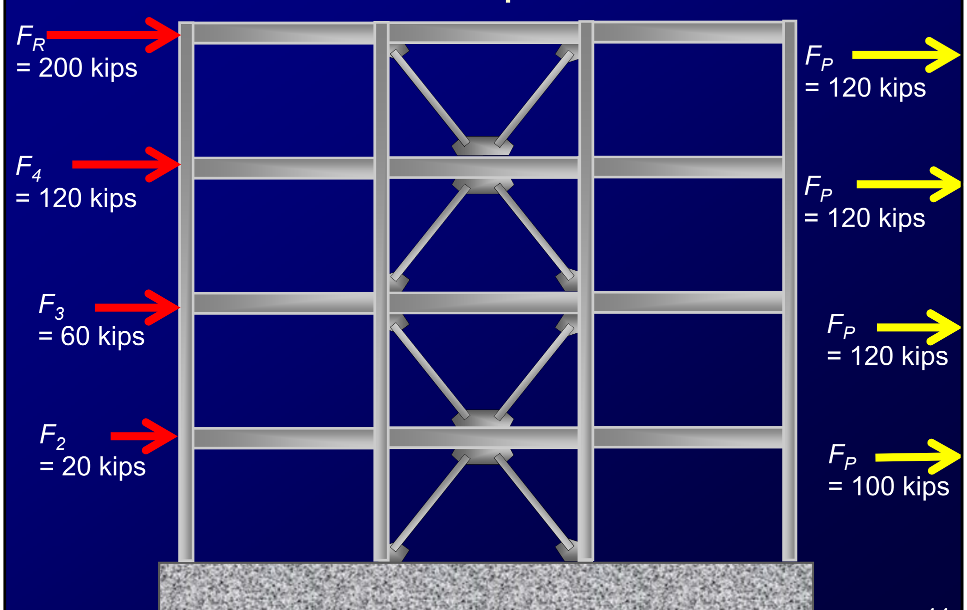
Part III:

Example: R3BF

Example



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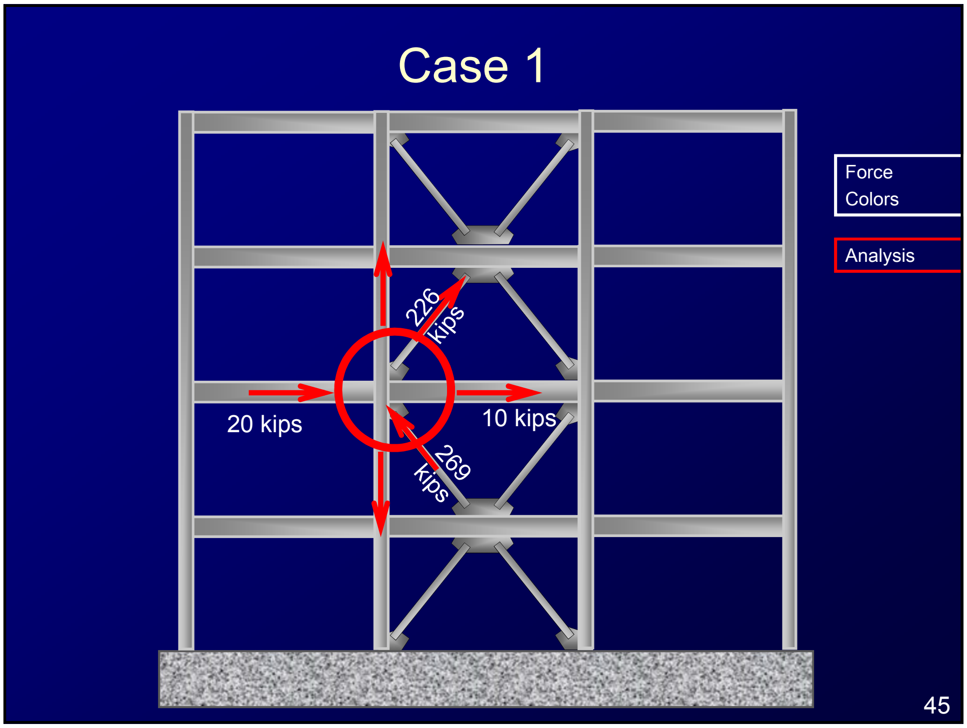
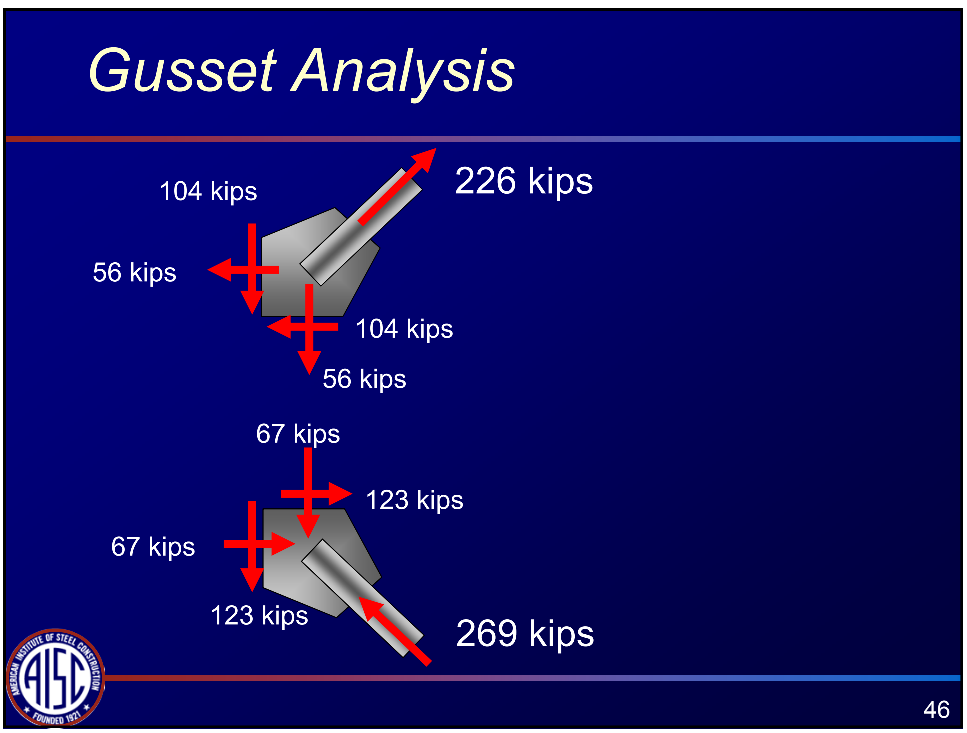
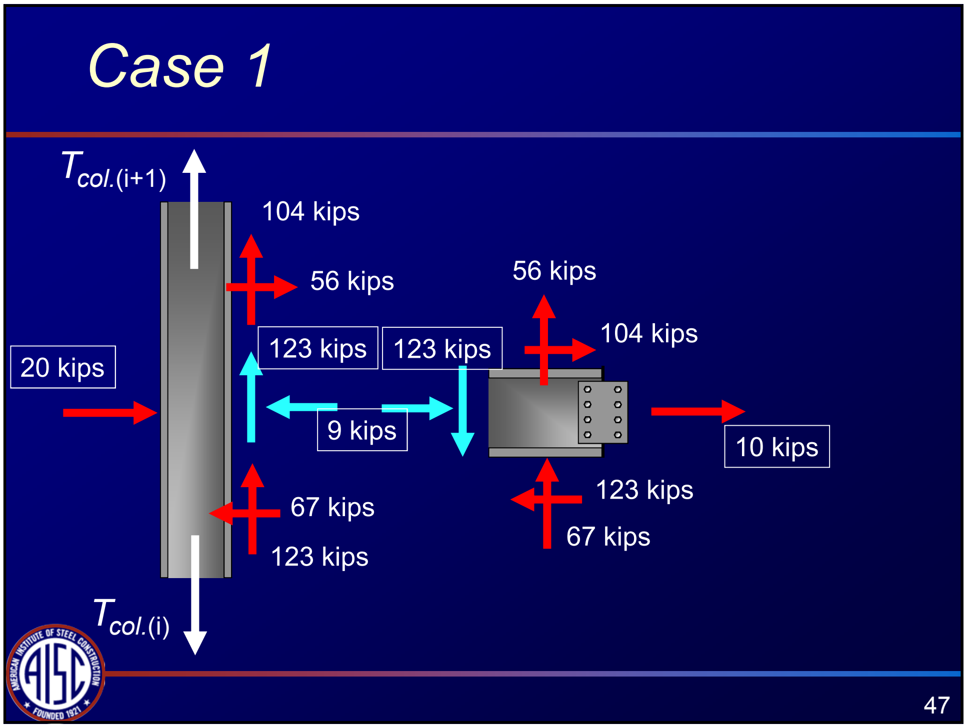
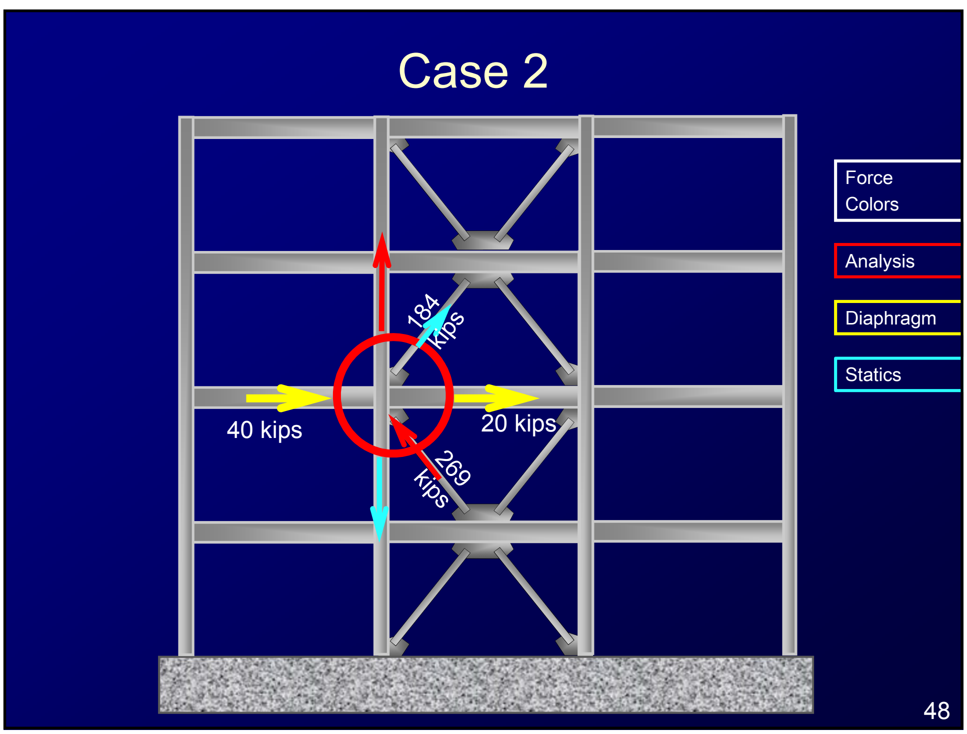
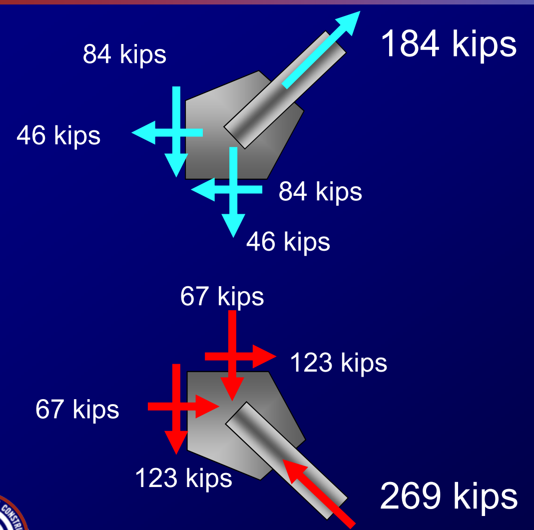

Case 1
Force Colors
Analysis
226 kips
20 kips
10 kips
269 kips
45


Gusset Analysis
104 kips
226 kips
56 kips
104 kips
56 kips
67 kips
123 kips
67 kips
123 kips
269 kips
46

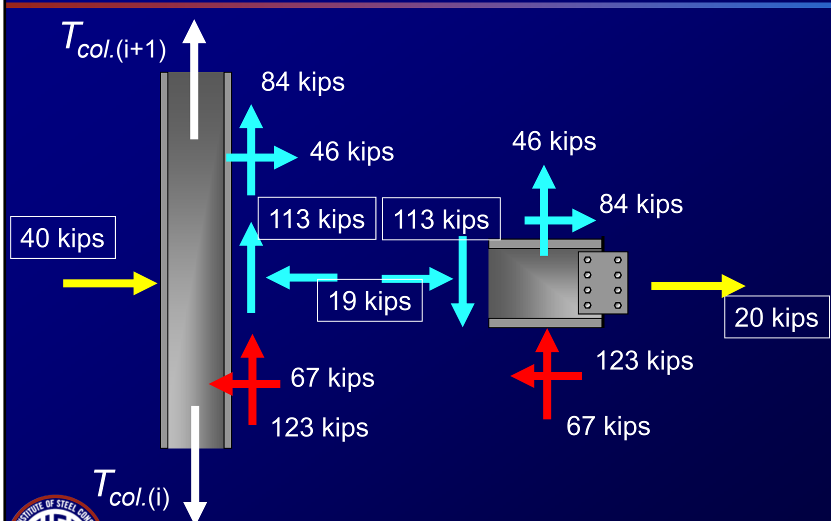

Case 1
$T_{col.(i+1)}$
104 kips
56 kips
56 kips
104 kips
20 kips
123 kips
123 kips
9 kips
10 kips
67 kips
123 kips
123 kips
67 kips
$T_{col.(i)}$
47

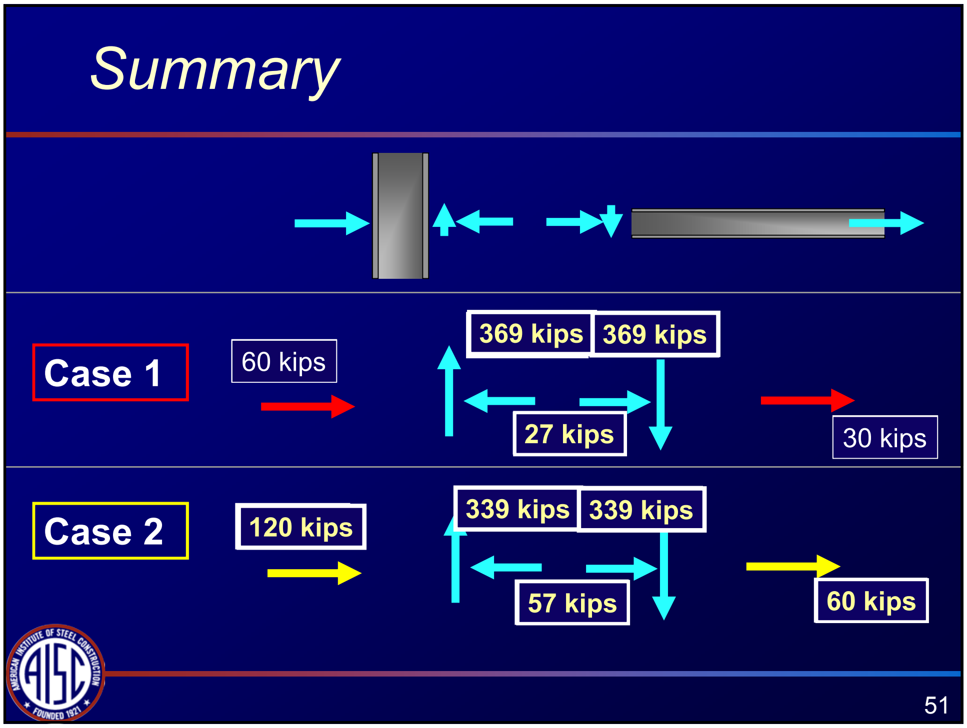

Case 2
Force Colors
Analysis
Diaphragm
Statics
184 kips
40 kips
20 kips
269 kips
48

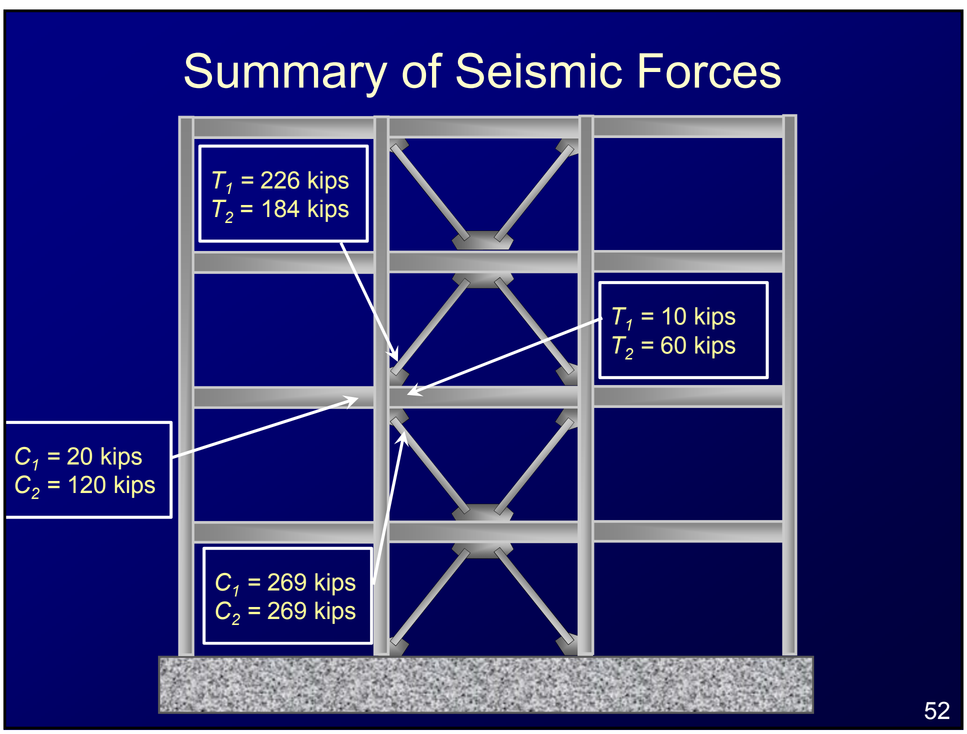
Gusset Analysis



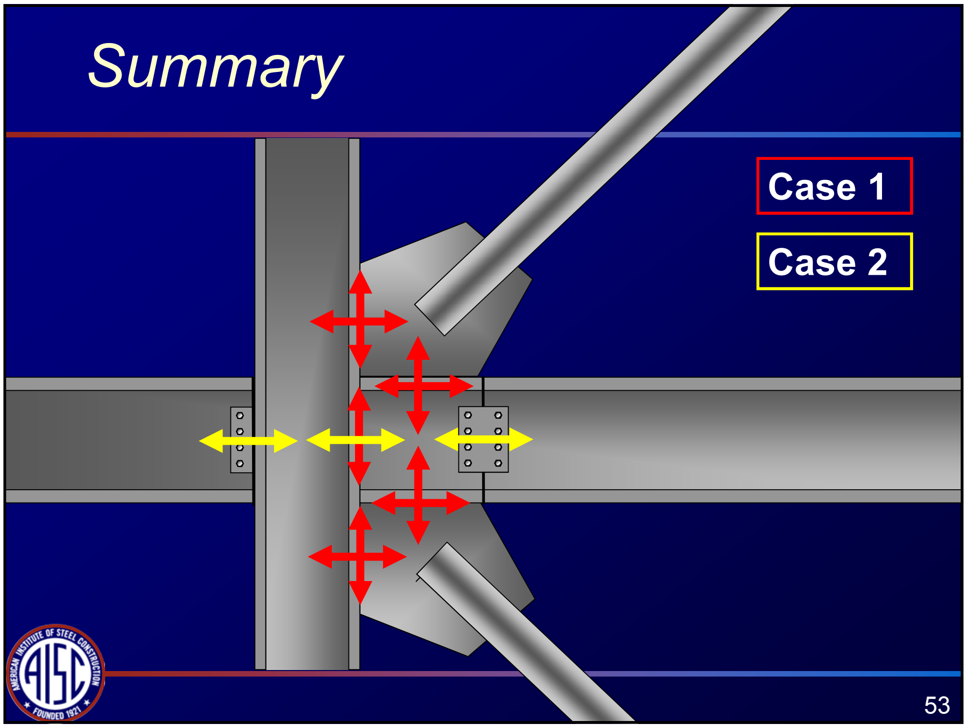
Case 2




Summary
Case 1
60 kips
369 kips
369 kips
27 kips
30 kips
Case 2
120 kips
339 kips
339 kips
57 kips
60 kips
51


Summary of Seismic Forces
T_1 = 226 kips
T_2 = 184 kips
T_1 = 10 kips
T_2 = 60 kips
C_1 = 20 kips
C_2 = 120 kips
C_1 = 269 kips
C_2 = 269 kips
52

Summary



Part IV:

Seismic
R=3.25

Seismic: R=3.25 (OCBF)

- Vertical force distribution insufficient
- Connections designed for $\Omega_o E$
  - Case 1
    - Vertical force distribution
    - Amplify all seismic forces by Ω_o
      - *Collectors*
      - *Braces*
    - Statically consistent
  - Case 2
    - Vertical force distribution with $F_{p(i)}$ instead of F_i
    - Adjust seismic forces in brace above for static equilibrium
    - Apply to Ω_o collectors and connections

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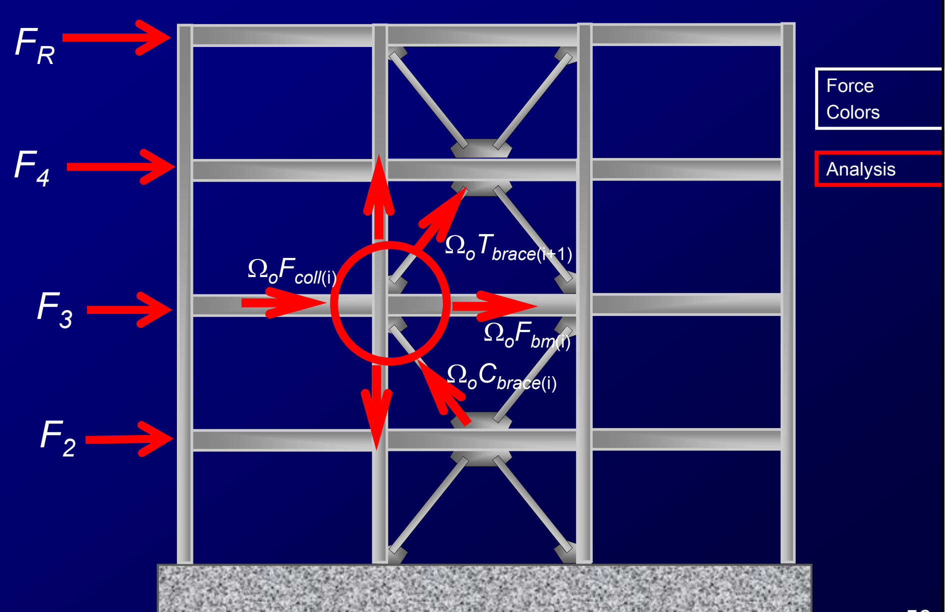
Case 1



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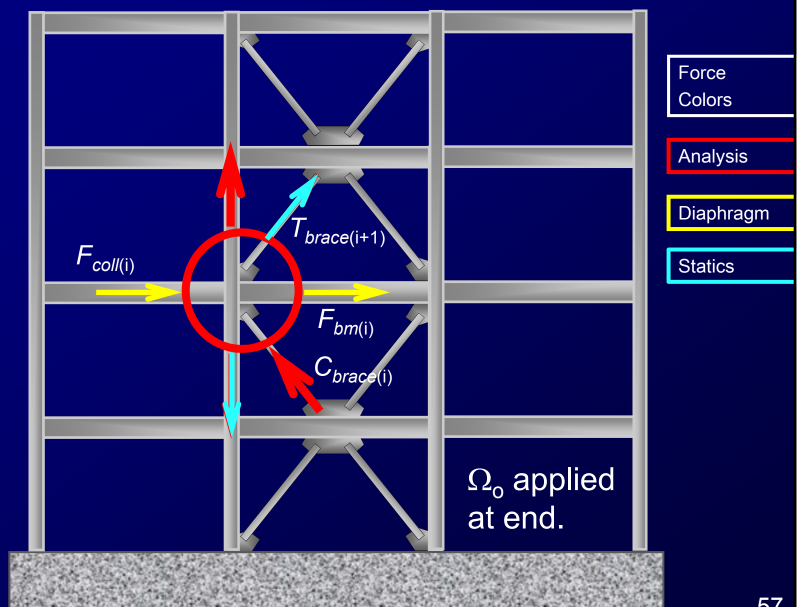
Case 2



Ω_o applied at end.

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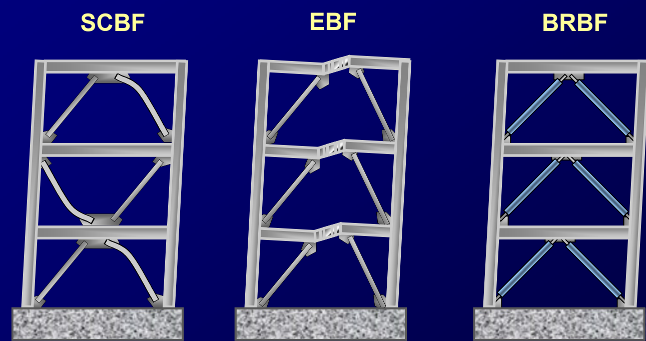
Part V:

Seismic
R>3.25

Seismic: R>3.25

Vertical force distribution is insufficient

- Must anticipate system yielding mechanisms



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Seismic: *R*>3.25

Case 1

- Vertical force distribution superseded by system yield mechanism
- Substitute forces corresponding to yield capacity

Case 2

- System yield mechanism with F_p

System-level analysis

- Capture a mechanism
- Ω_o superseded by mechanism analysis

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SCBF

$T_{brace(i+1)} = T_{max}$

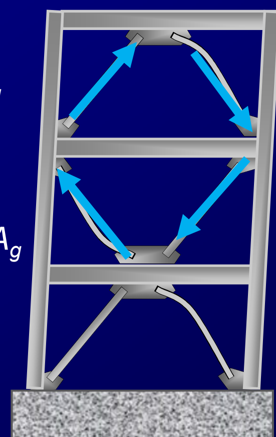
$= R_y F_y A_g$

AISC 341 F2.3

$C_{brace(i)} = C_{max}$

$= F_{cr(expected)} A_g$

AISC 341 F2.3



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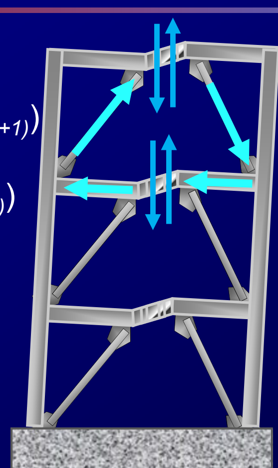
EBF

$T_{brace(i+1)} = T_{max}$

$= F(V_{n(i+1)})$

$C_{beam(i)} = F(V_{n(i)})$



$V_{n(i+1)} \leq 1.25*0.6\ R_y F_y A_w$

$\leq 1.25*\ 2\ R_y F_y Z / e$

AISC 341 F3.3

$V_{n(i)} \leq 1.25*0.6\ R_y F_y A_w$

$\leq 1.25*\ 2\ R_y F_y Z / e$

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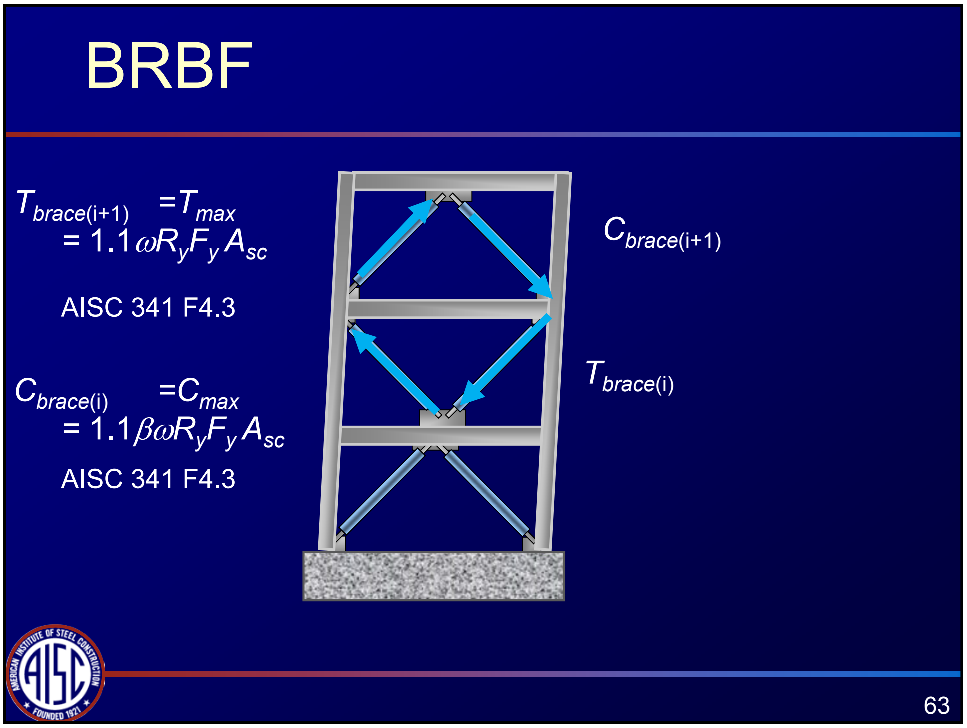
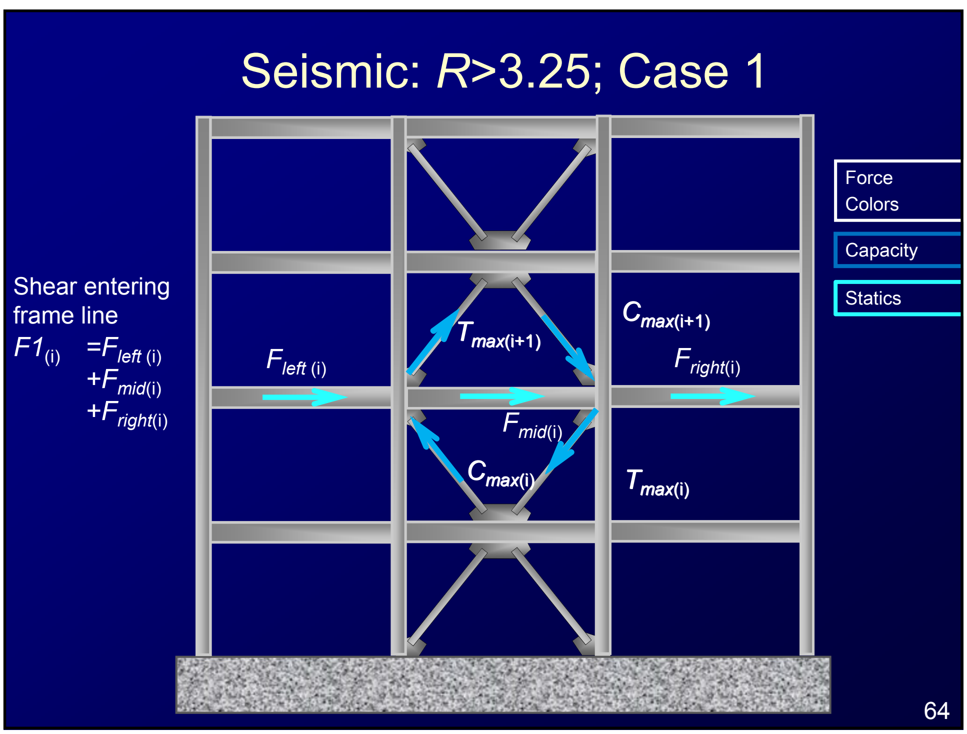
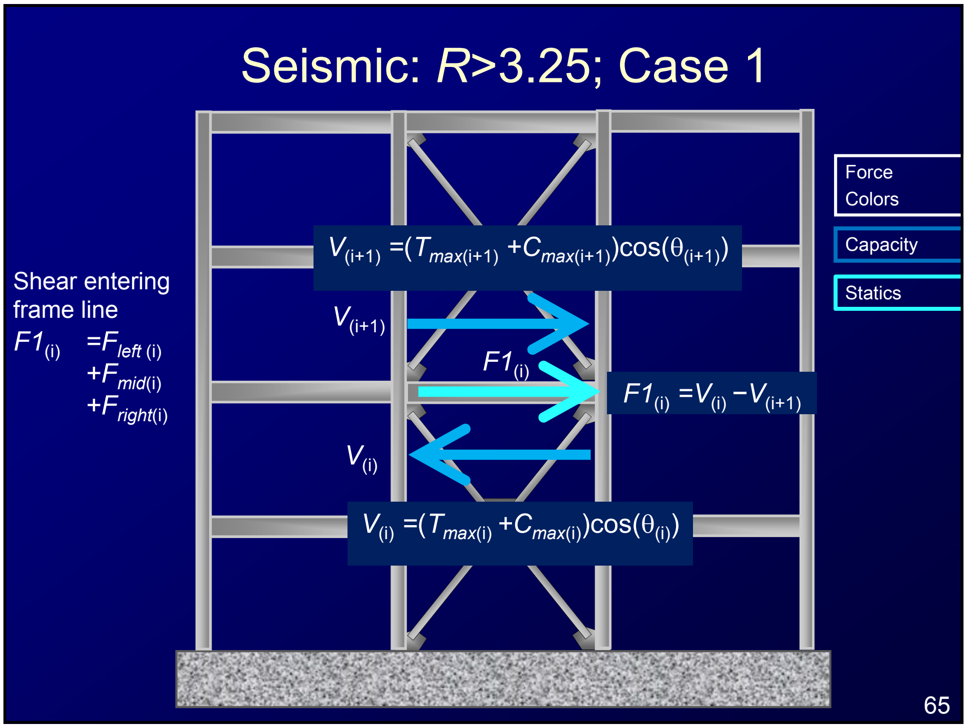
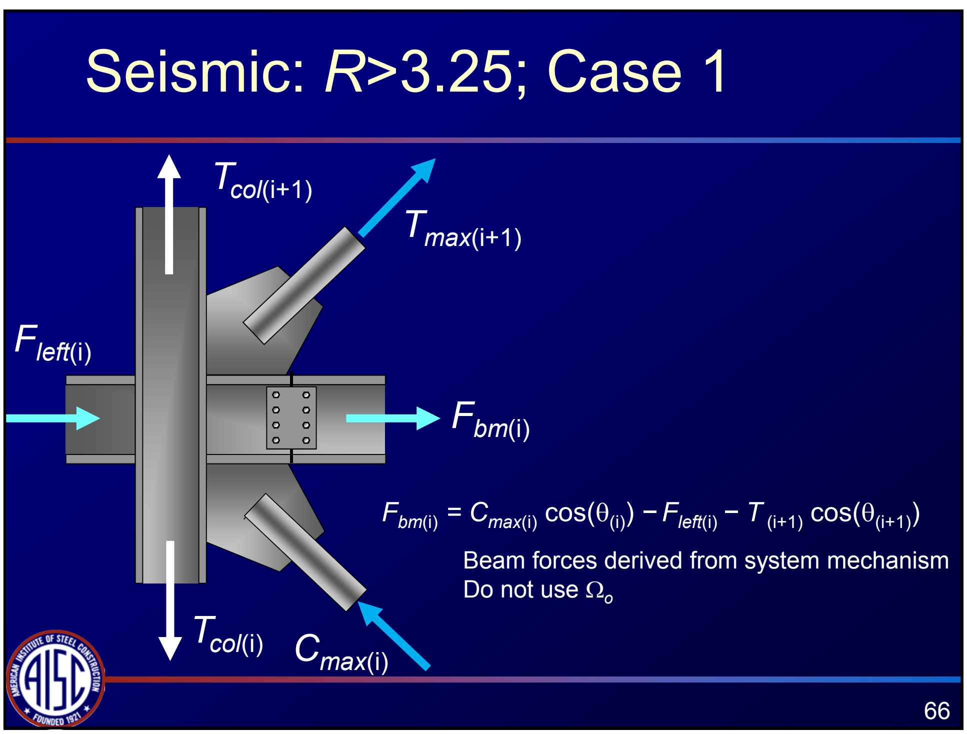
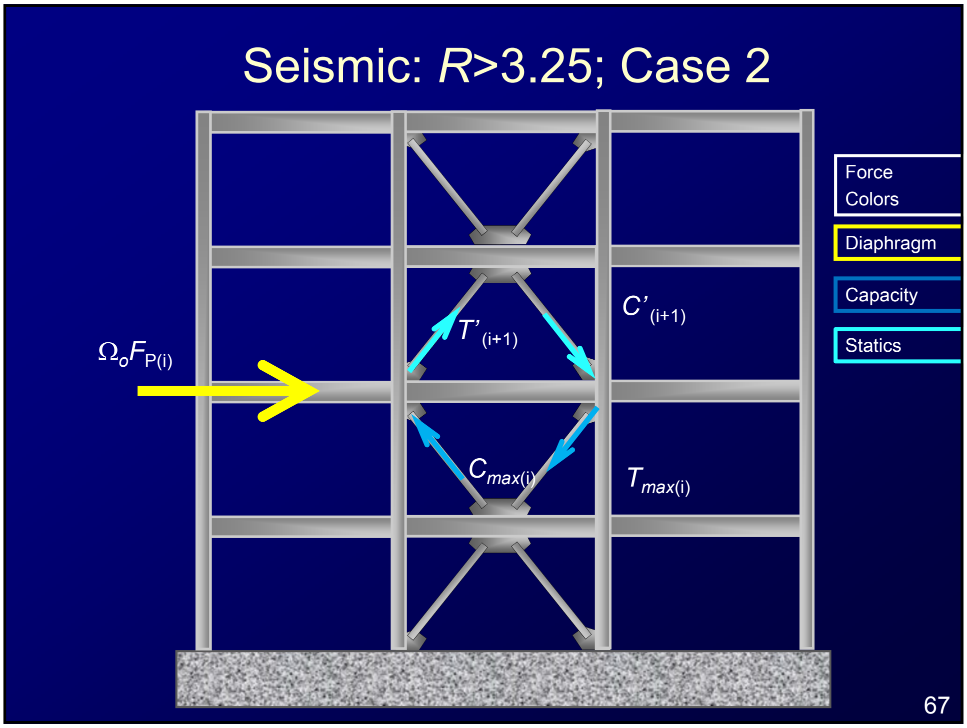
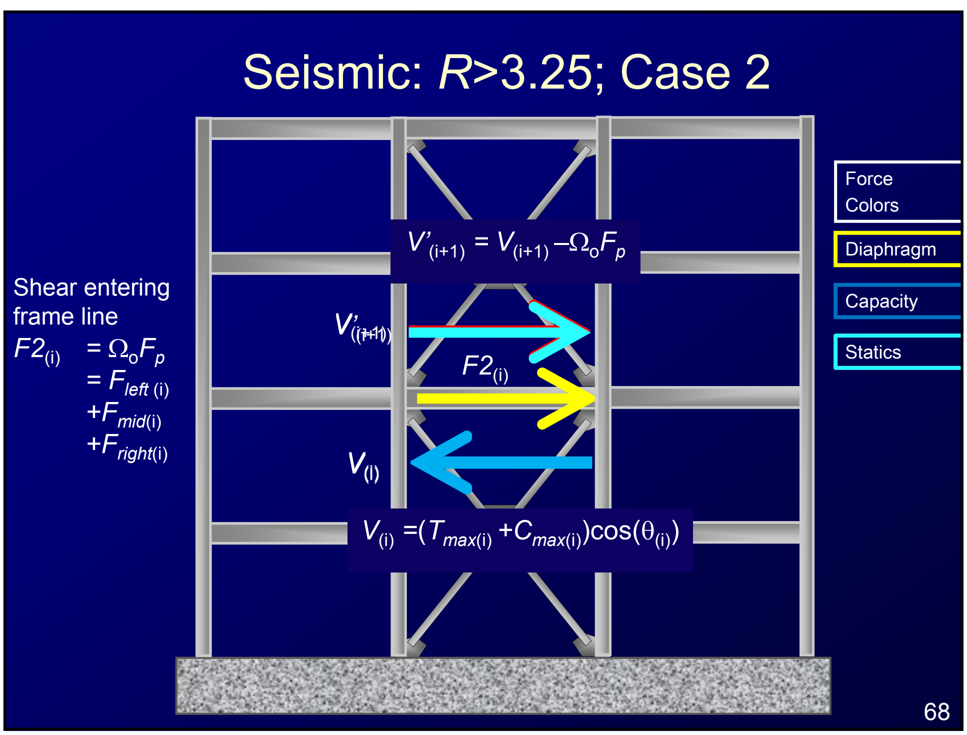

BRBF
$T_{brace(i+1)} = T_{max}$
$= 1.1\omega R_y F_y A_{sc}$
AISC 341 F4.3
$C_{brace(i)} = C_{max}$
$= 1.1\beta\omega R_y F_y A_{sc}$
AISC 341 F4.3
$C_{brace(i+1)}$
$T_{brace(i)}$
63

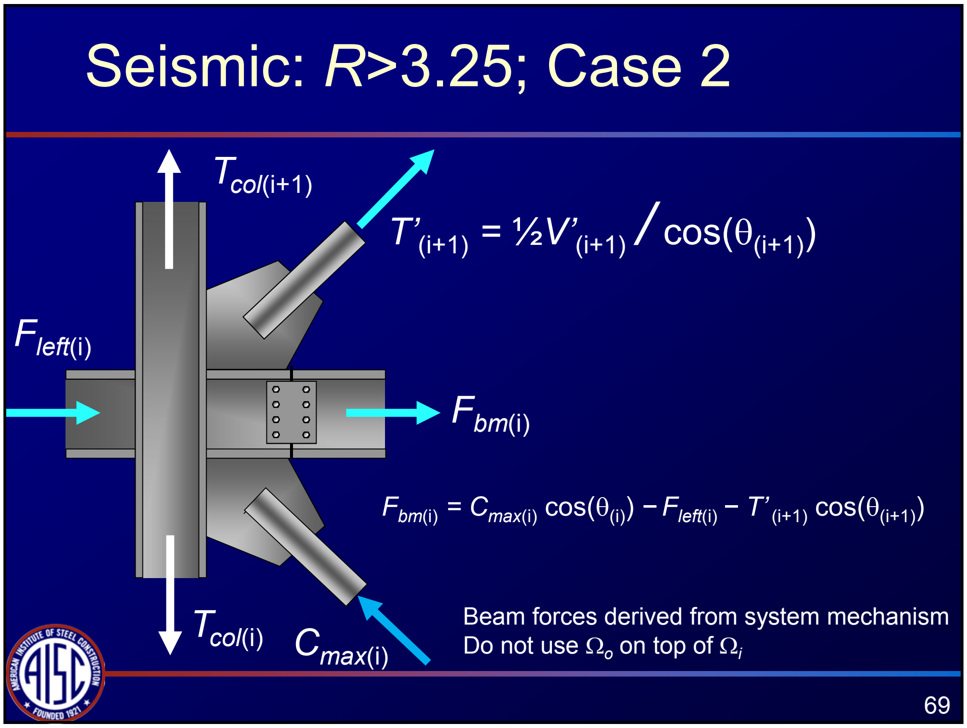

Seismic: R>3.25; Case 1
Shear entering frame line
$F1_{(i)} = F_{left\ (i)} + F_{mid(i)} + F_{right(i)}$
$F_{left\ (i)}$
$T_{max(i+1)}$
$C_{max(i+1)}$
$F_{right(i)}$
$F_{mid(i)}$
$C_{max(i)}$
$T_{max(i)}$
Force Colors
Capacity
Statics
64

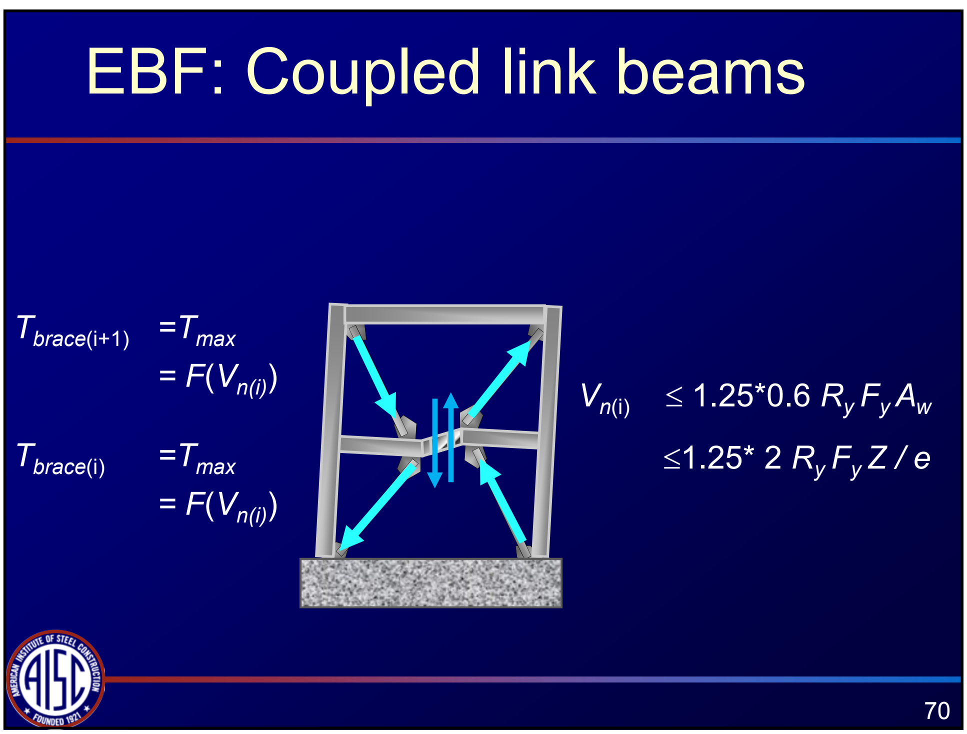

Seismic: R>3.25; Case 1
Force Colors
Capacity
Statics
Shear entering frame line
F1(i) =Fleft (i) +Fmid(i) +Fright(i)
V(i+1) =(Tmax(i+1) +Cmax(i+1))cos(θ(i+1))
V(i+1)
F1(i)
F1(i) =V(i) −V(i+1)
V(i)
V(i) =(Tmax(i) +Cmax(i))cos(θ(i))
65


Seismic: R>3.25; Case 1
Tcol(i+1)
Tmax(i+1)
Fleft(i)
Fbm(i)
Fbm(i) = Cmax(i) cos(θ(i)) − Fleft(i) − T(i+1) cos(θ(i+1))
Beam forces derived from system mechanism
Do not use Ωo
Tcol(i)
Cmax(i)
66


Seismic: R>3.25; Case 2
Force Colors
Diaphragm
Capacity
Statics
ΩoFP(i)
T'(i+1)
C'(i+1)
Cmax(i)
Tmax(i)
67


Seismic: R>3.25; Case 2
Force Colors
Diaphragm
Capacity
Statics
V'(i+1) = V(i+1) −ΩoFp
Shear entering frame line
F2(i) = ΩoFp
= Fleft (i)
+Fmid(i)
+Fright(i)
V'(i+1)
F2(i)
V(i)
V(i) =(Tmax(i) +Cmax(i))cos(θ(i))
68

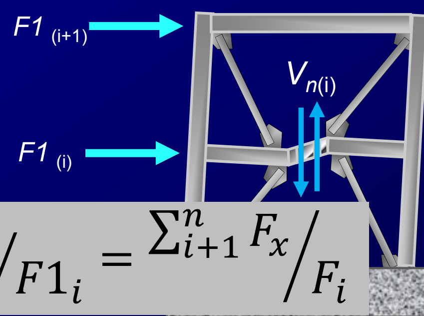

Seismic: R>3.25; Case 2
T col(i+1)
T'(i+1) = ½V'(i+1) / cos(θ(i+1))
F left(i)
F bm(i)
F bm(i) = C max(i) cos(θ(i)) − F left(i) − T'(i+1) cos(θ(i+1))
T col(i)
C max(i)
Beam forces derived from system mechanism
Do not use Ωo on top of Ωi
69


EBF: Coupled link beams
T brace(i+1) =T max
= F(V n(i))
T brace(i) =T max
= F(V n(i))
V n(i) ≤ 1.25*0.6 Ry Fy Aw
≤1.25* 2 Ry Fy Z / e
70

EBF: Coupled link beams

$F1_{(i+1)}\,(h_i + h_{i+1}) + F1_{(i)}\,h_i = V_{n(i)}\,L_i$

$$F2_{i+1} / F2_i = \sum_{i+1}^{n} F_x / F_{p_i}$$



$$F1_{i+1} / F1_i = \sum_{i+1}^{n} F_x / F_i$$

One engineer's approach:

Case 1:
Use vertical distribution.

Case 2:
Use vertical distribution with F_p.

Use distribution shapes.

Scale link shear capacity.

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Part VI:

Post-buckled SCBF

Post-buckled SCBF

Vertical force distribution is insufficient

- Must anticipate system yielding mechanisms
  - Case 1 for R>3.25 applies
  - Case 2 for R>3.25 applies
- Include post-buckling condition
  - Case 3 required

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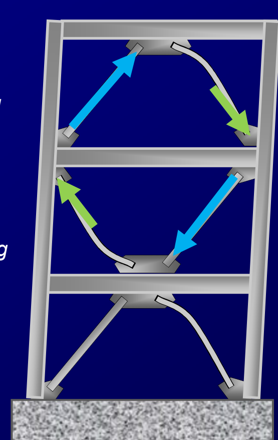
Post-buckled SCBF

$T_{brace(i+1)}$ $=T_{max}$ $= R_y F_y A_g$

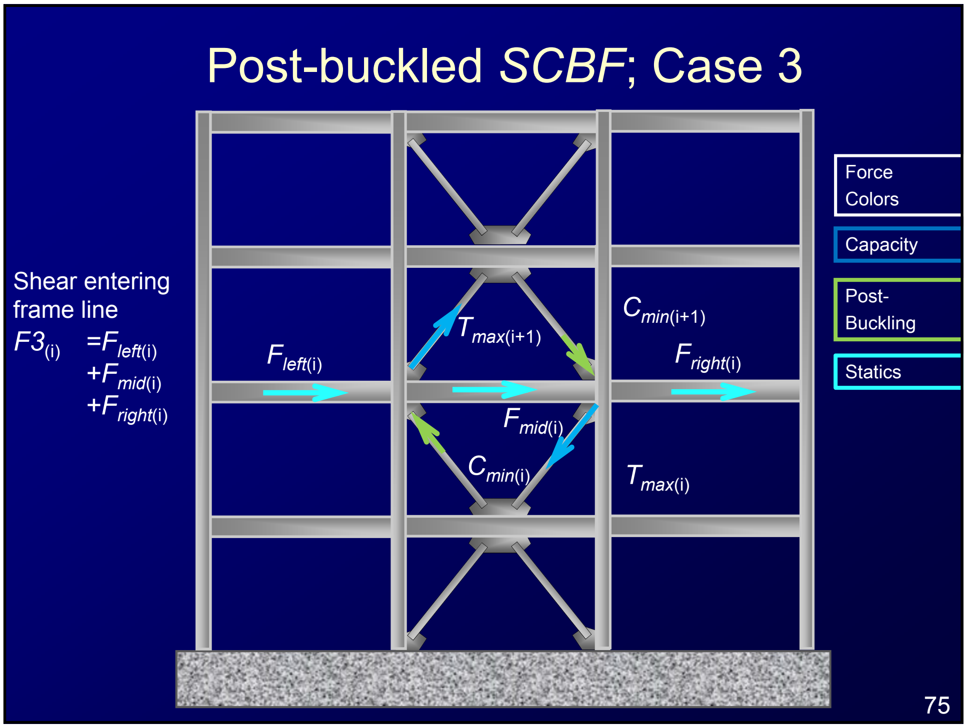
$C_{brace(i+1)}$ $=C_{min}$ $= 0.3F_{cr}A_g$

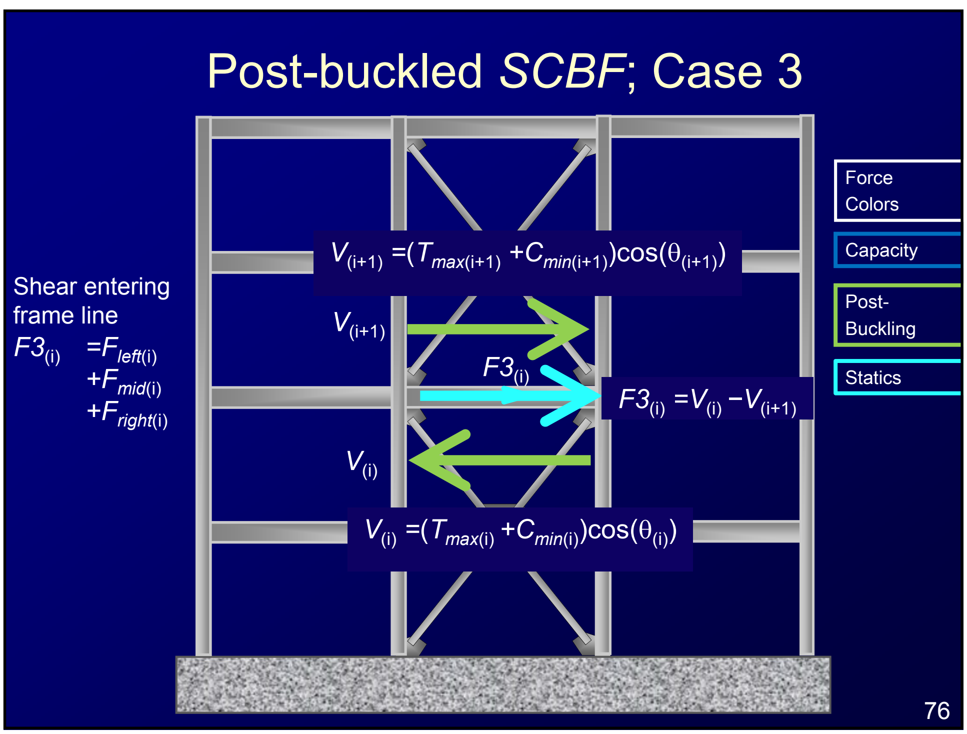


$C_{brace(i)}$ $=C_{min}$ $= 0.3F_{cr}A_g$

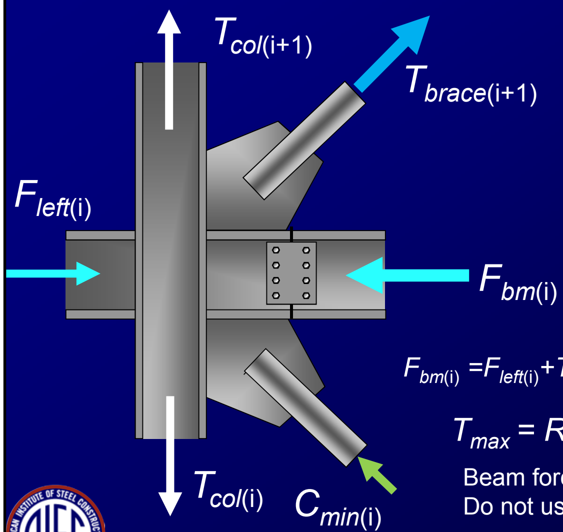
$T_{brace(i)}$ $=T_{max}$ $= R_y F_y A_g$

74


Post-buckled SCBF; Case 3
Shear entering frame line
F3(i) =Fleft(i) +Fmid(i) +Fright(i)
Fleft(i)
Tmax(i+1)
Cmin(i+1)
Fright(i)
Fmid(i)
Cmin(i)
Tmax(i)
Force Colors
Capacity
Post-Buckling
Statics
75


Post-buckled SCBF; Case 3
Shear entering frame line
F3(i) =Fleft(i) +Fmid(i) +Fright(i)
V(i+1) =(Tmax(i+1) +Cmin(i+1))cos(θ(i+1))
V(i+1)
F3(i)
F3(i) =V(i) −V(i+1)
V(i)
V(i) =(Tmax(i) +Cmin(i))cos(θ(i))
Force Colors
Capacity
Post-Buckling
Statics
76

Post-buckled *SCBF*; Case 3



$F_{bm(i)} = F_{left(i)} + T_{max(i+1)} \cos(\theta_{(i+1)}) - C_{min(i)} \cos(\theta_{(i)})$

$T_{max} = R_y F_y A_g$ $C_{min} = 0.3\ F_{cr} A_g$

Beam forces derived from system mechanism

Do not use Ω_o

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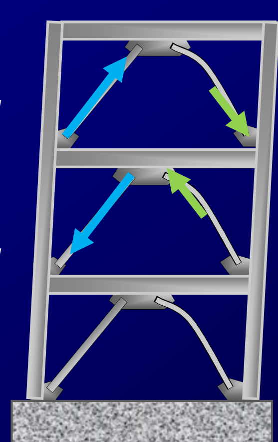
Post-buckled *SCBF*; Case 3

$T_{brace(i+1)}$ $= T_{max}$
$= R_y F_y A_g$

$T_{brace(i)}$ $= T_{max}$
$= R_y F_y A_g$

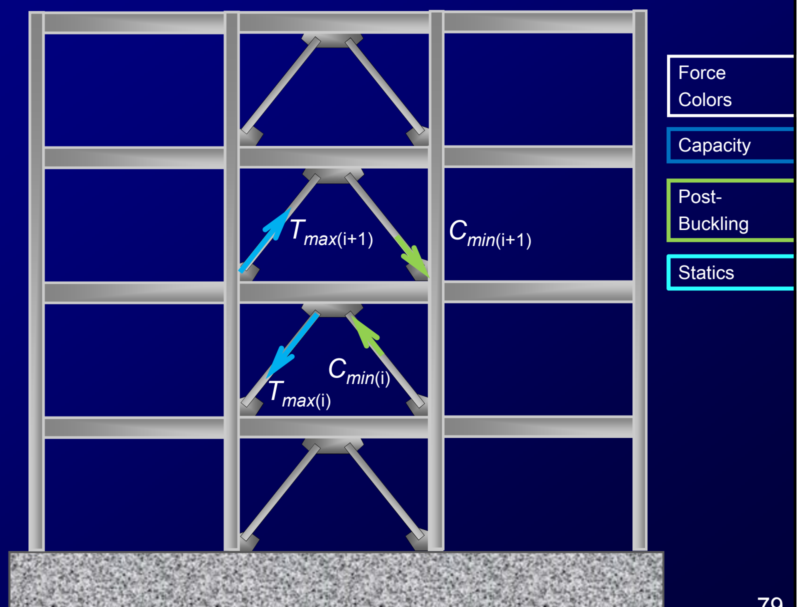


$C_{brace(i+1)}$ $= C_{min}$
$= 0.3 F_{cr} A_g$

$C_{brace(i)}$ $= C_{min}$
$= 0.3 F_{cr} A_g$

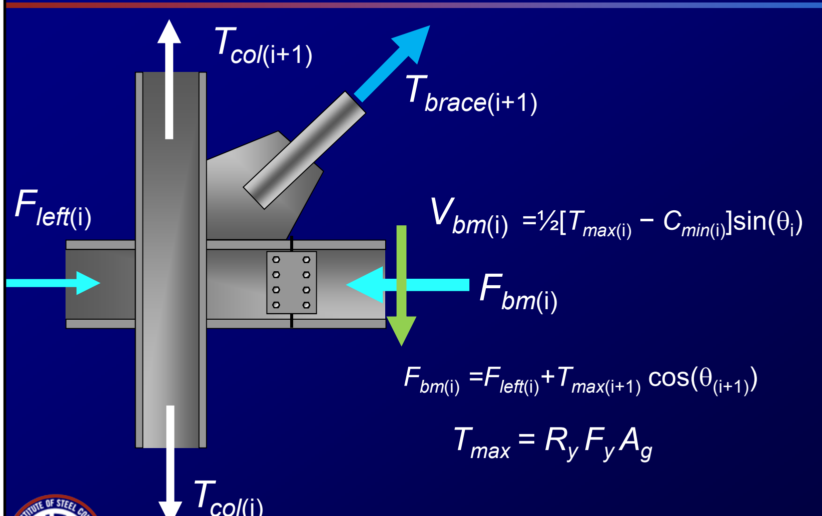
78

Post-buckled *SCBF*; Case 3



79

Post-buckled *SCBF*; Case 3

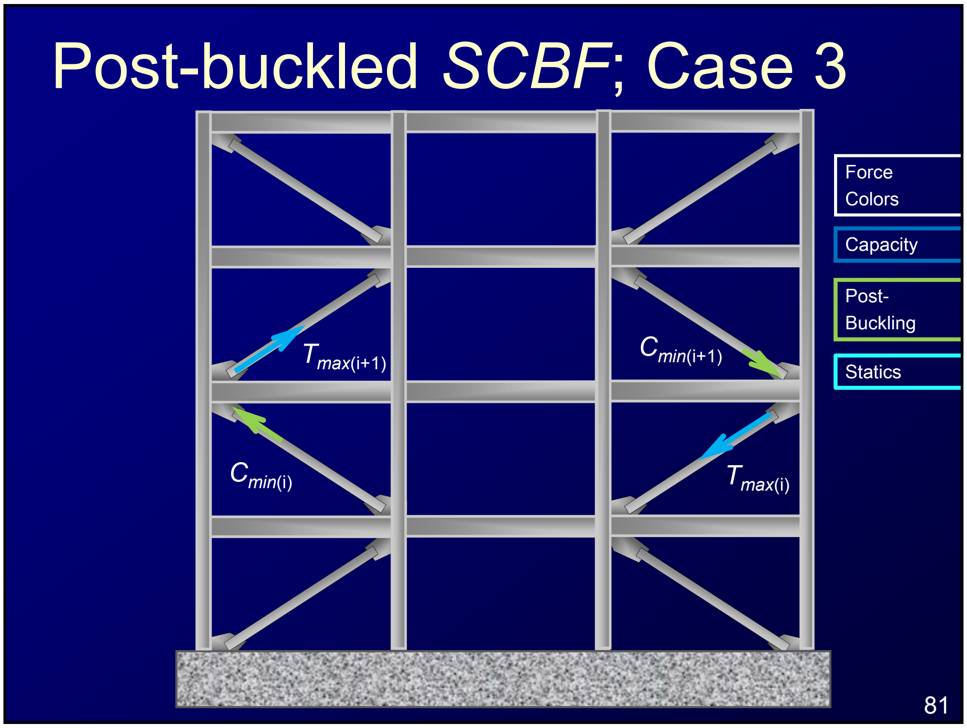


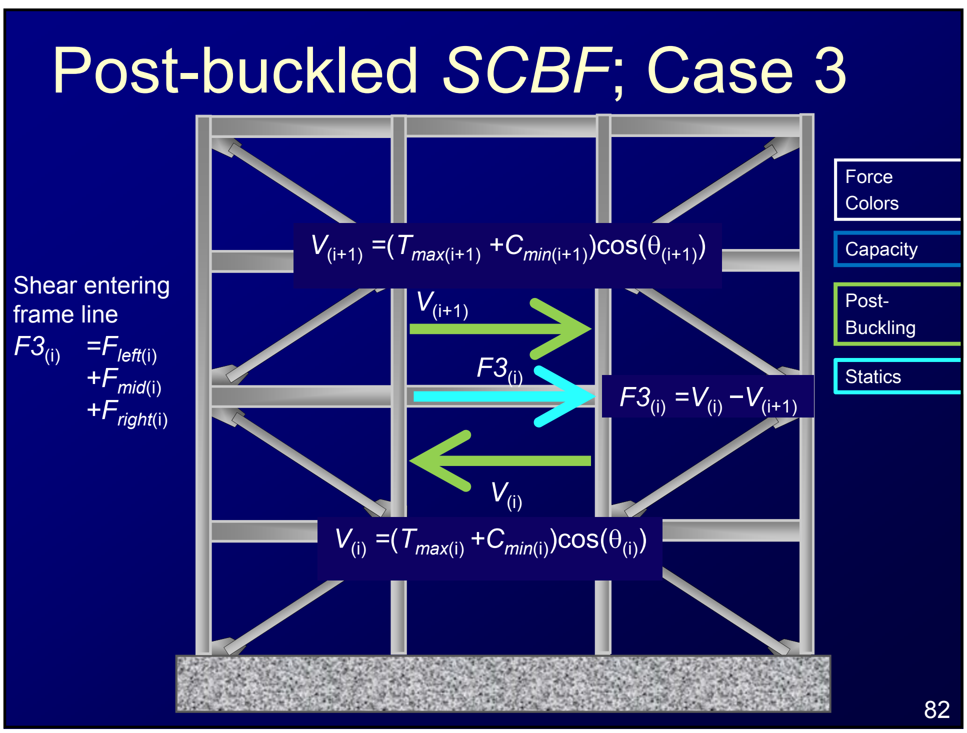
$V_{bm(i)} = ½[T_{max(i)} - C_{min(i)}]\sin(\theta_i)$

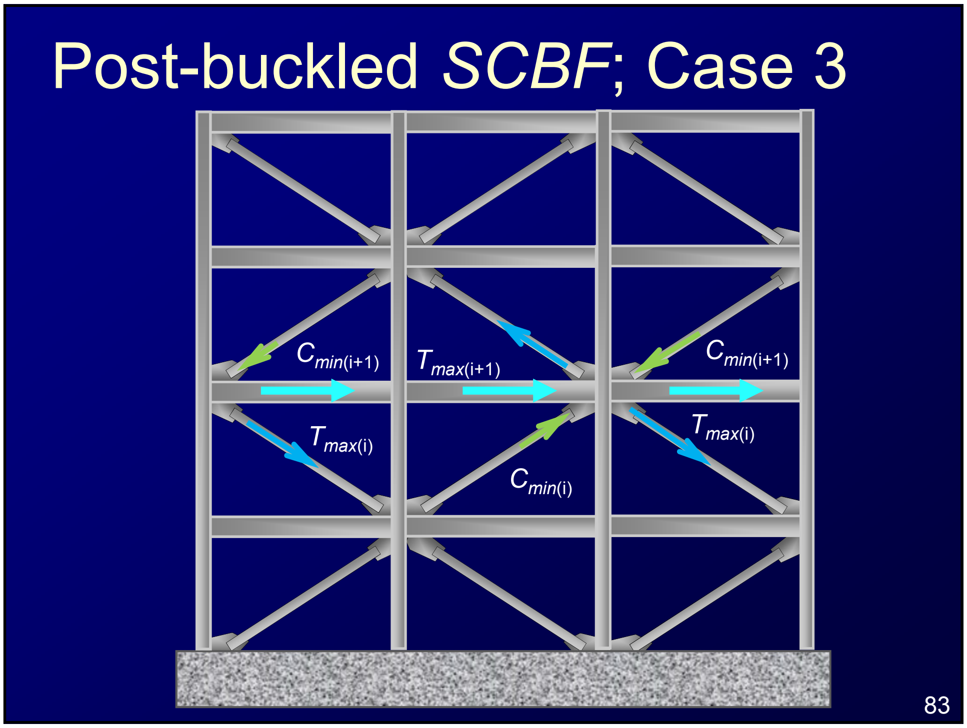
$F_{bm(i)} = F_{left(i)} + T_{max(i+1)} \cos(\theta_{(i+1)})$

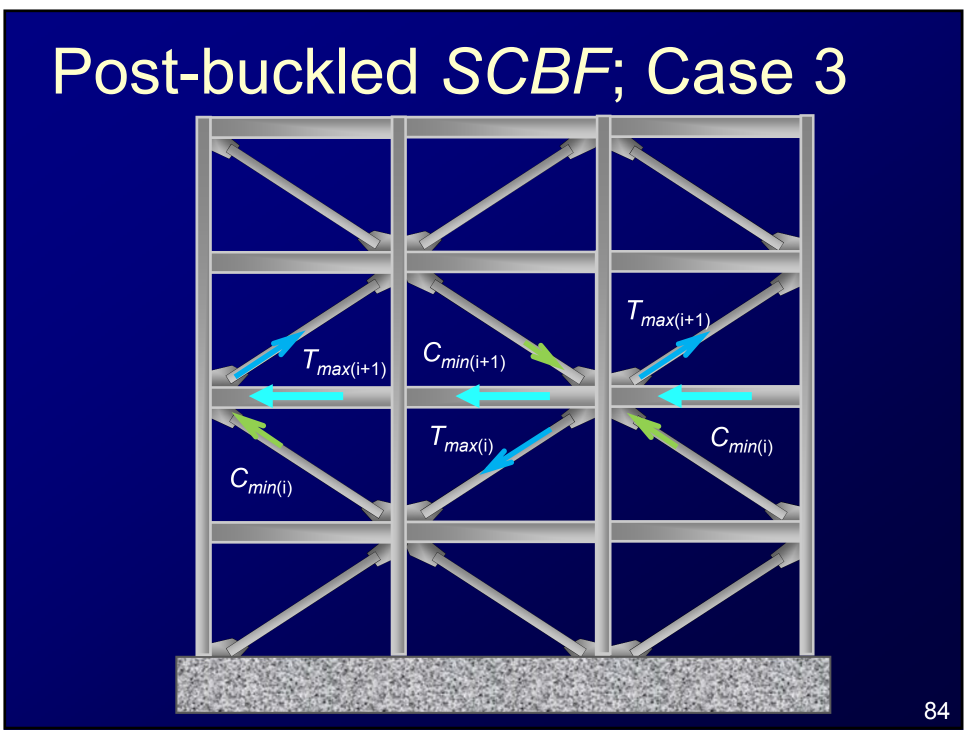
$T_{max} = R_y F_y A_g$

80


Post-buckled SCBF; Case 3
$T_{max(i+1)}$
$C_{min(i+1)}$
$C_{min(i)}$
$T_{max(i)}$
Force Colors
Capacity
Post-Buckling
Statics
81


Post-buckled SCBF; Case 3
$V_{(i+1)} = (T_{max(i+1)} + C_{min(i+1)})\cos(\theta_{(i+1)})$
Shear entering frame line
$F3_{(i)} = F_{left(i)} + F_{mid(i)} + F_{right(i)}$
$V_{(i+1)}$
$F3_{(i)}$
$F3_{(i)} = V_{(i)} - V_{(i+1)}$
$V_{(i)}$
$V_{(i)} = (T_{max(i)} + C_{min(i)})\cos(\theta_{(i)})$
Force Colors
Capacity
Post-Buckling
Statics
82

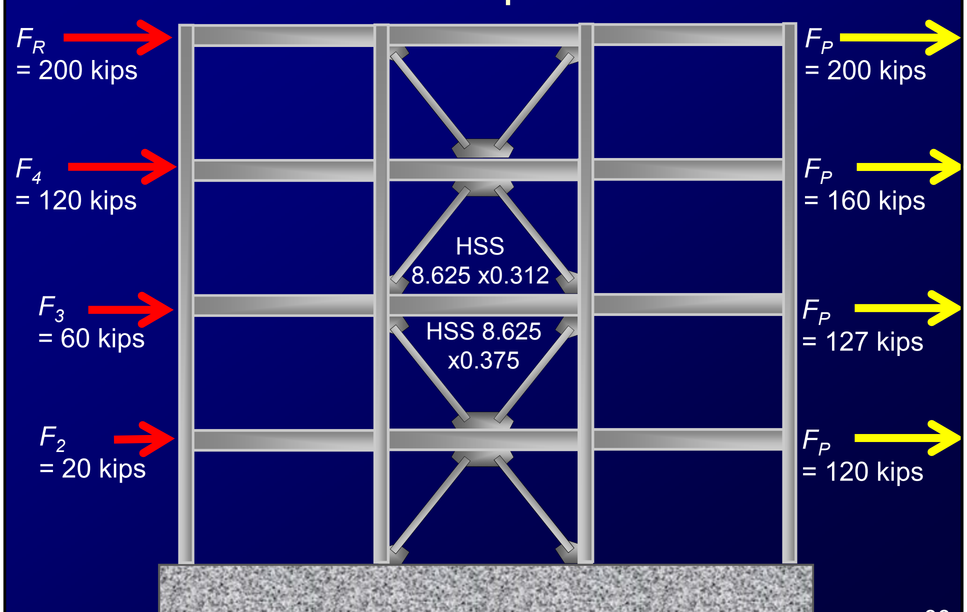

Post-buckled *SCBF*; Case 3
$C_{min(i+1)}$
$T_{max(i+1)}$
$C_{min(i+1)}$
$T_{max(i)}$
$T_{max(i)}$
$C_{min(i)}$
83


Post-buckled *SCBF*; Case 3
$T_{max(i+1)}$
$T_{max(i+1)}$
$C_{min(i+1)}$
$T_{max(i)}$
$C_{min(i)}$
$C_{min(i)}$
84

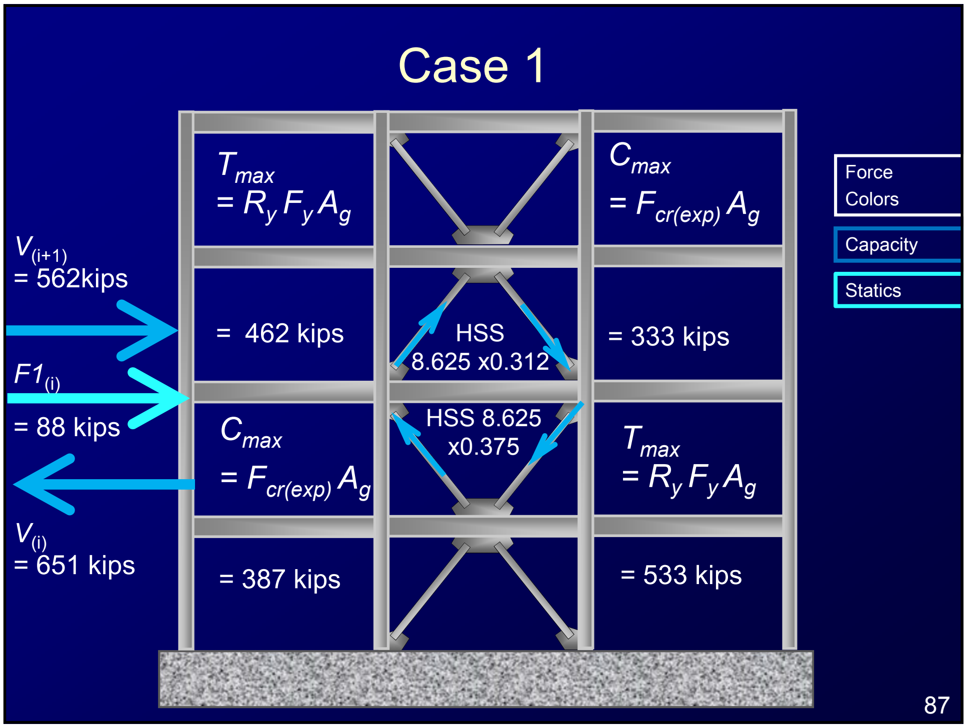
Part VII:

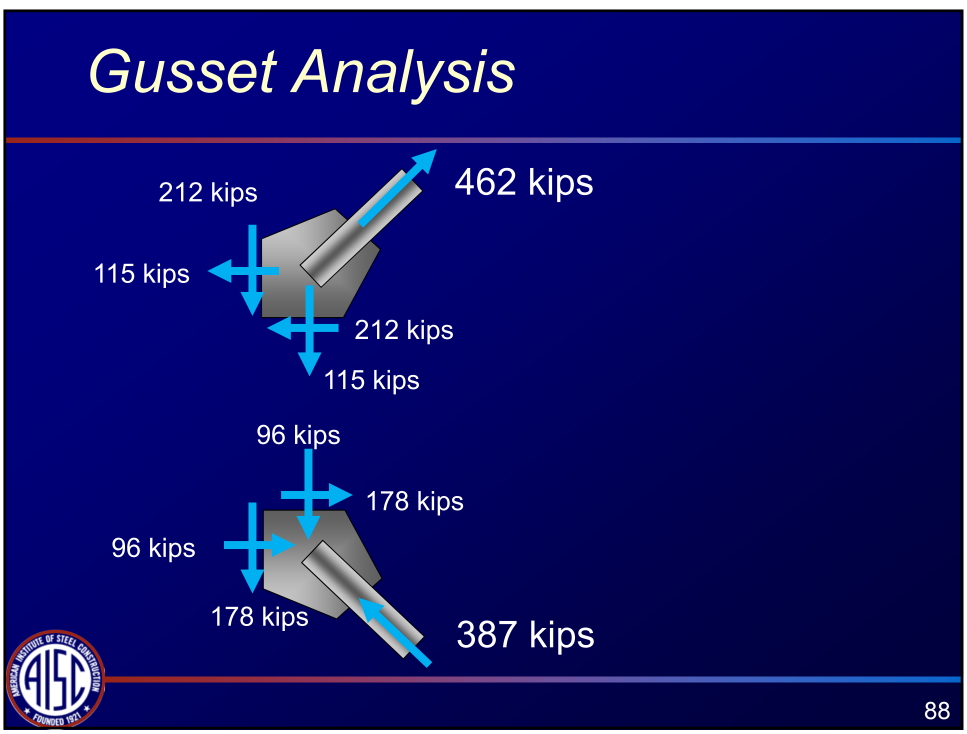
Example: SCBF

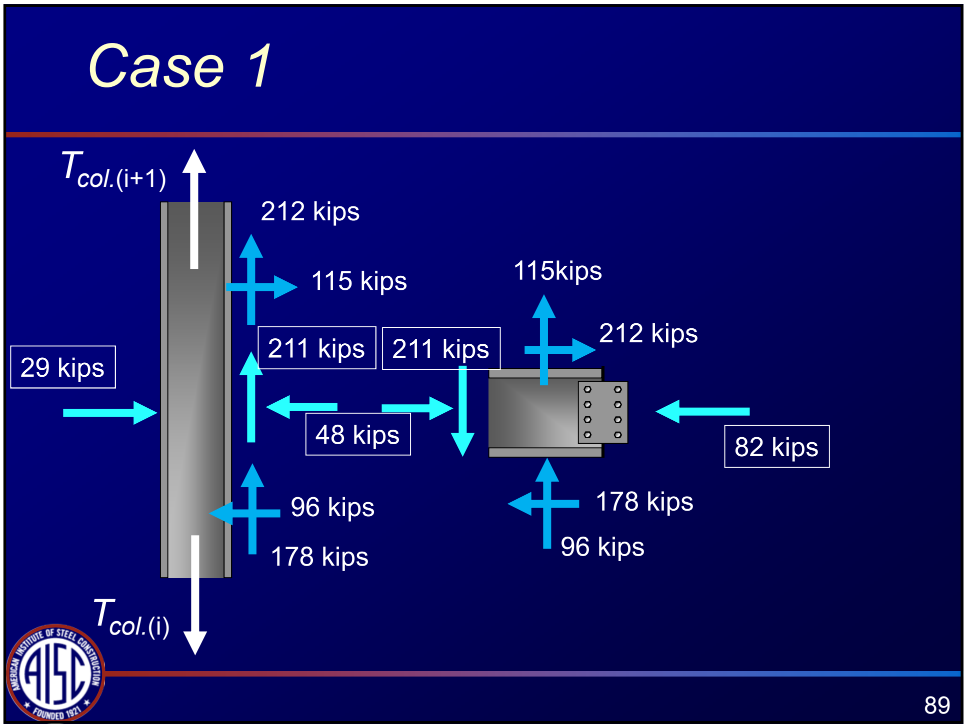
Example

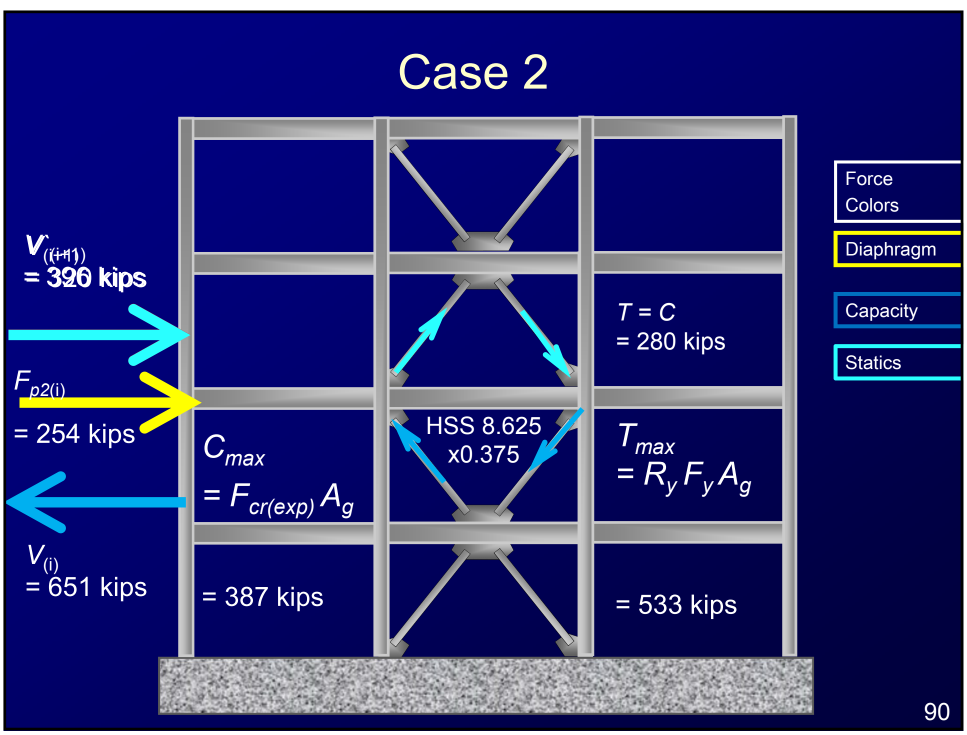


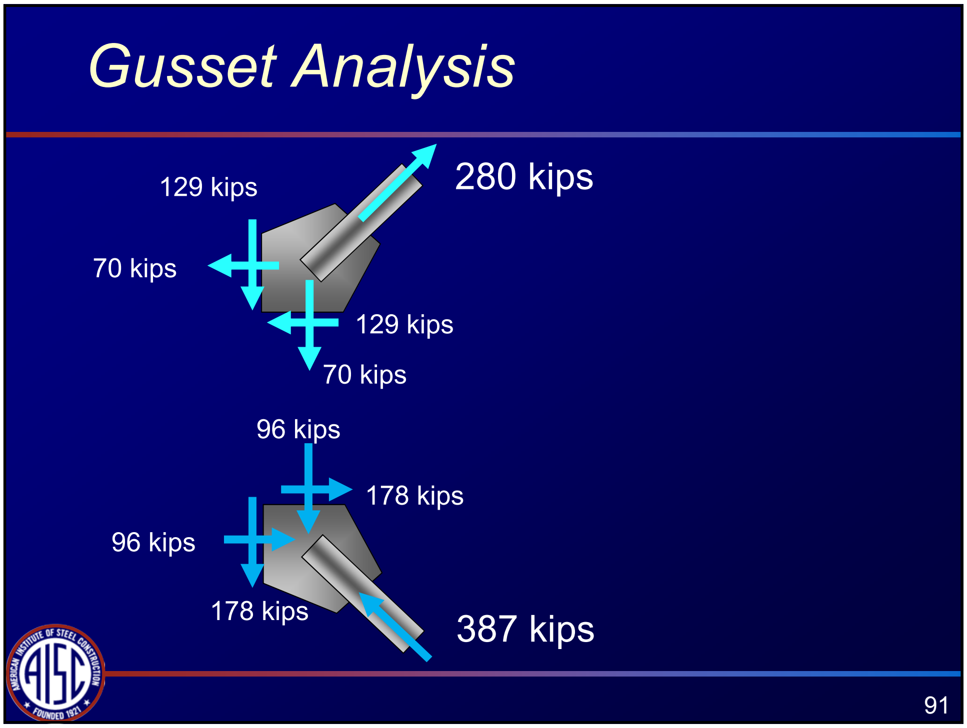
86

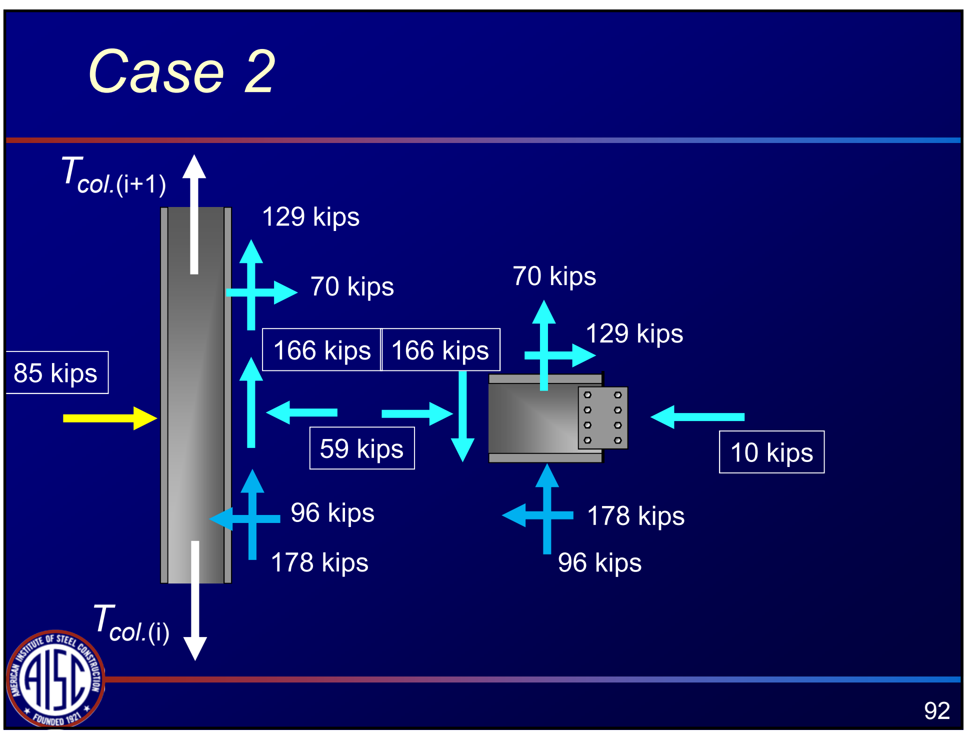

Case 1
T_{max}
$= R_y F_y A_g$
C_{max}
$= F_{cr(exp)} A_g$
$V_{(i+1)}$
= 562kips
= 462 kips
HSS
8.625 x0.312
= 333 kips
$F1_{(i)}$
= 88 kips
C_{max}
$= F_{cr(exp)} A_g$
HSS 8.625
x0.375
T_{max}
$= R_y F_y A_g$
$V_{(i)}$
= 651 kips
= 387 kips
= 533 kips
Force
Colors
Capacity
Statics
87

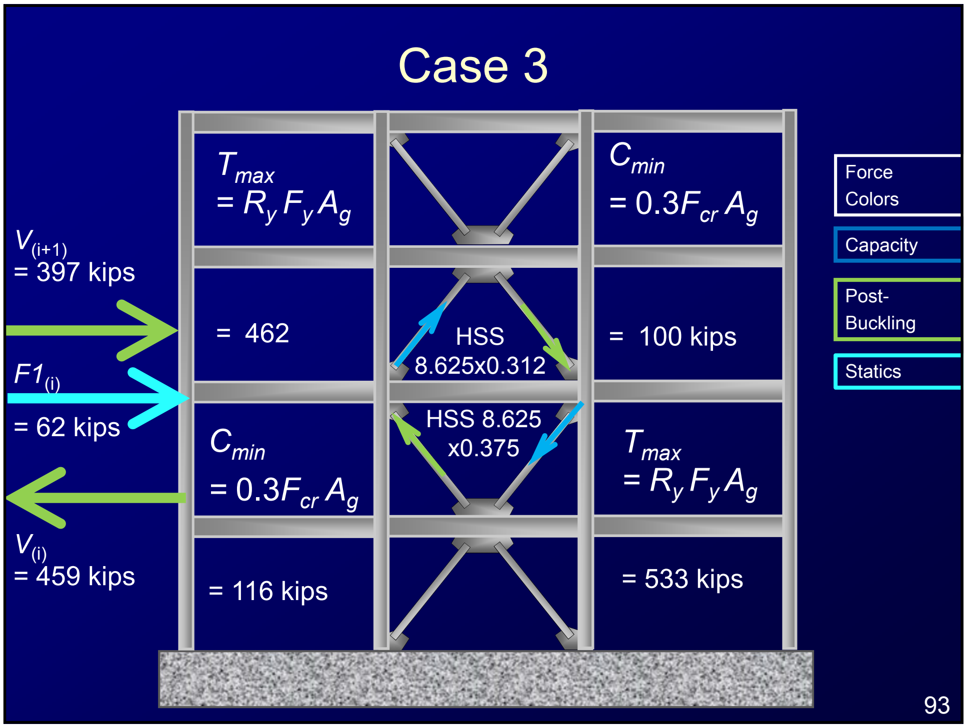

Gusset Analysis
212 kips
462 kips
115 kips
212 kips
115 kips
96 kips
178 kips
96 kips
178 kips
387 kips
88

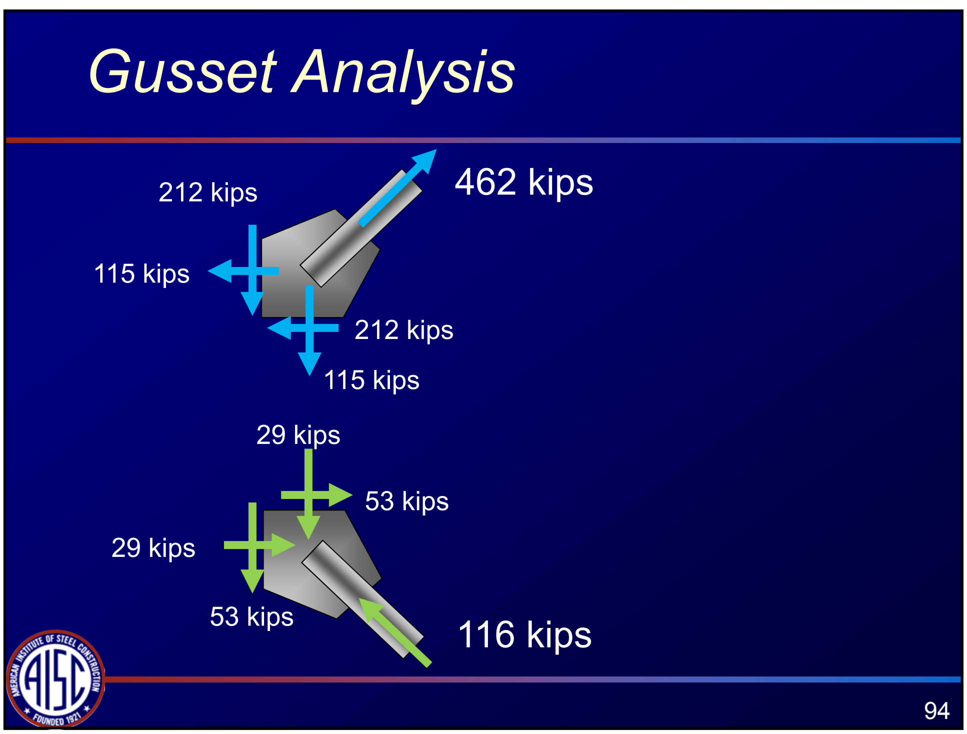

Case 1
T col.(i+1)
212 kips
115 kips
115kips
212 kips
211 kips
211 kips
29 kips
48 kips
82 kips
96 kips
178 kips
178 kips
96 kips
T col.(i)
89

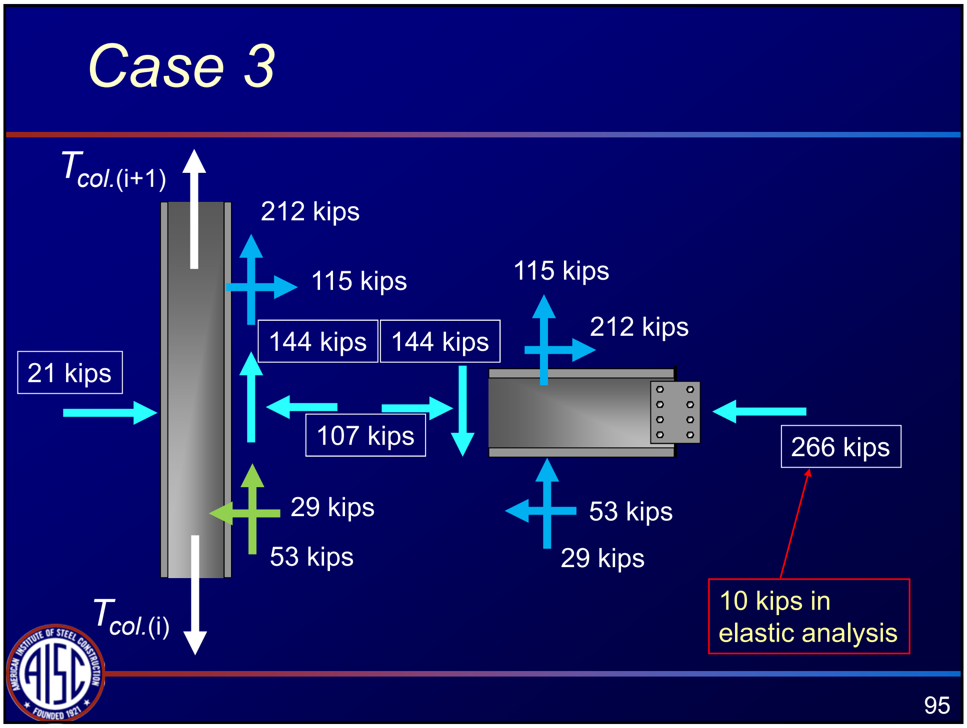

Case 2
Force Colors
Diaphragm
Capacity
Statics
V(i+1)
= 396 kips
F p2(i)
= 254 kips
V(i)
= 651 kips
T = C
= 280 kips
HSS 8.625 x0.375
C max
= F cr(exp) A g
= 387 kips
T max
= R y F y A g
= 533 kips
90

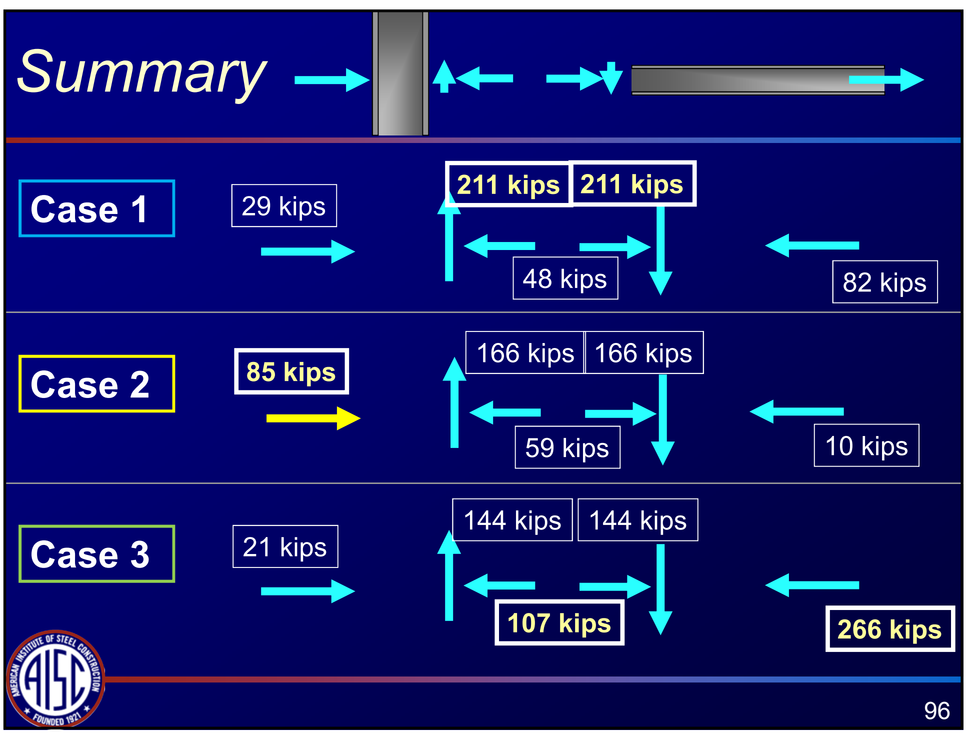

Gusset Analysis
129 kips
280 kips
70 kips
129 kips
70 kips
96 kips
178 kips
96 kips
178 kips
387 kips
91

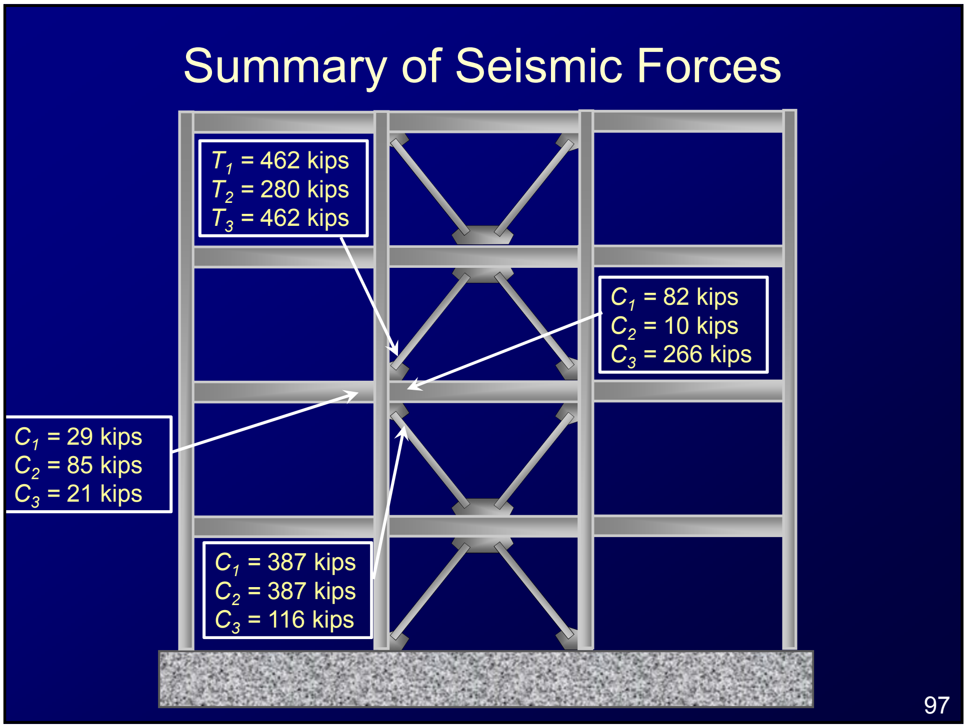

Case 2
$T_{col.(i+1)}$
129 kips
70 kips
70 kips
129 kips
166 kips
166 kips
85 kips
59 kips
10 kips
96 kips
178 kips
178 kips
96 kips
$T_{col.(i)}$
92

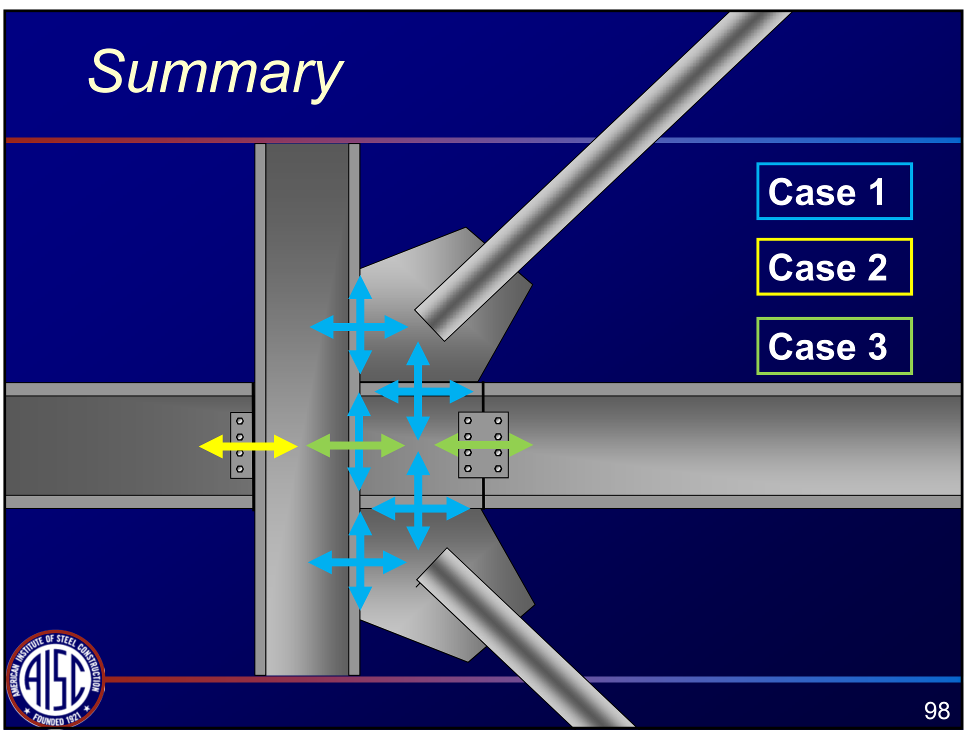

Case 3
T_{max}
$= R_y F_y A_g$
C_{min}
$= 0.3F_{cr} A_g$
$V_{(i+1)}$
= 397 kips
= 462
HSS
8.625x0.312
= 100 kips
$F1_{(i)}$
= 62 kips
HSS 8.625
x0.375
C_{min}
$= 0.3F_{cr} A_g$
T_{max}
$= R_y F_y A_g$
$V_{(i)}$
= 459 kips
= 116 kips
= 533 kips
Force
Colors
Capacity
Post-
Buckling
Statics
93


Gusset Analysis
212 kips
462 kips
115 kips
212 kips
115 kips
29 kips
53 kips
29 kips
53 kips
116 kips
94


Case 3
$T_{col.(i+1)}$
212 kips
115 kips
115 kips
212 kips
144 kips
144 kips
21 kips
107 kips
266 kips
29 kips
53 kips
53 kips
29 kips
$T_{col.(i)}$
10 kips in
elastic analysis
95


Summary
Case 1
29 kips
211 kips
211 kips
48 kips
82 kips
Case 2
85 kips
166 kips
166 kips
59 kips
10 kips
Case 3
21 kips
144 kips
144 kips
107 kips
266 kips
96


Summary of Seismic Forces
T_1 = 462 kips
T_2 = 280 kips
T_3 = 462 kips
C_1 = 82 kips
C_2 = 10 kips
C_3 = 266 kips
C_1 = 29 kips
C_2 = 85 kips
C_3 = 21 kips
C_1 = 387 kips
C_2 = 387 kips
C_3 = 116 kips
97


Summary
Case 1
Case 2
Case 3
98

Conclusion

Conclusion

3 types of forces must be reconciled in the design of braced-frame connections for lateral load

Base-shear forces	Wind, R=3, R>3
Equivalent lateral force	
Modal response spectrum analysis	
Diaphragm accelerations	R=3, R>3
System yield mechanism forces	R>3

Understanding the purpose of the design loads is key to meaningful application

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Conclusion

- Forces can be reconciled by envisioning two separate load cases (3 for SCBF)
  - Case 1
    - Base-shear forces or mechanism forces
  - Case 2
    - Diaphragm accelerations combined with base-shear forces or mechanism forces
  - Adjustments made to satisfy statics
- Load Cases can be consolidated
  - Case 1 results in maximum vertical forces at connections
  - Case 2 *may* result in maximum horizontal forces at connections

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Conclusion

- Omegification
  - R3BF (SDC C), OCBF
    - *Omegify all of E*
  - *R* > 3
    - *Use mechanism analyses*
    - *Supersedes* Ω_o
    - Ω_o *still applies for collector and diaphragm*

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Thank you

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- You will receive an email on how to report attendance from: registration@aisc.org.
- Be on the lookout: Check your spam filter! Check your junk folder!
- Completely fill out online form. Don't forget to check the boxes next to each attendee's name!

CEU/PDH Certificates

Within 2 business days…

- New reporting site (URL will be provided in the forthcoming email).
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- Password: Same as AISC website password.

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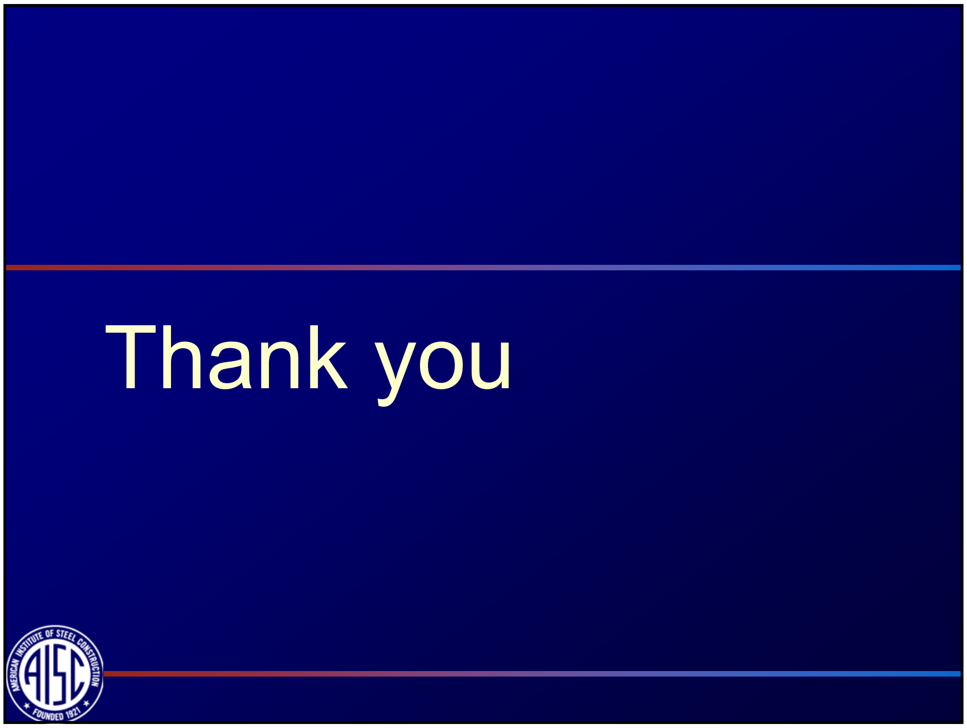
Thank you