

SEMINAR CHANGE TO IBS – A MUST

**Future construction industry:
Are we relevant?**

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Civil and Structural Engineering Branch
JKR Malaysia**



8 December 2015

Presentation Outline

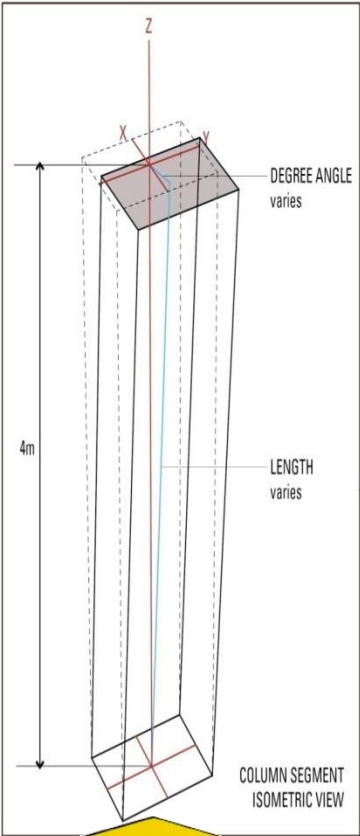
- State of the enterprise – now and then
- Demand for greater value
- Issues arising
- Lack of convergence
- Summary



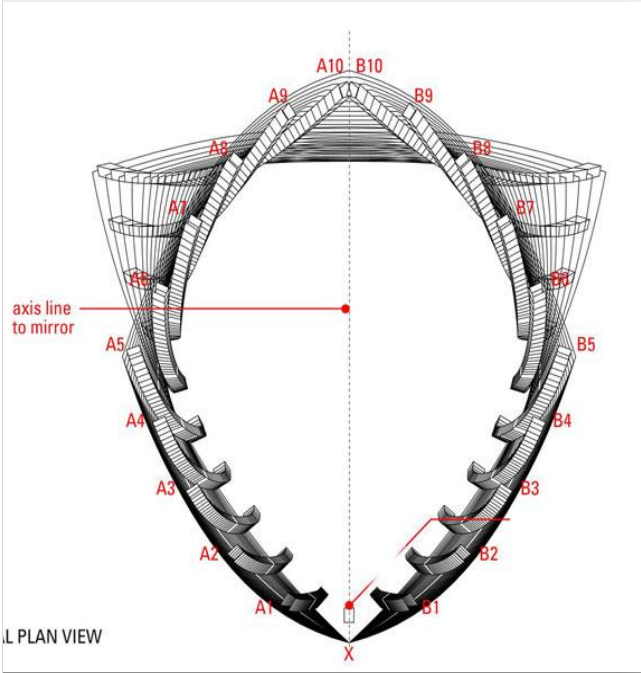
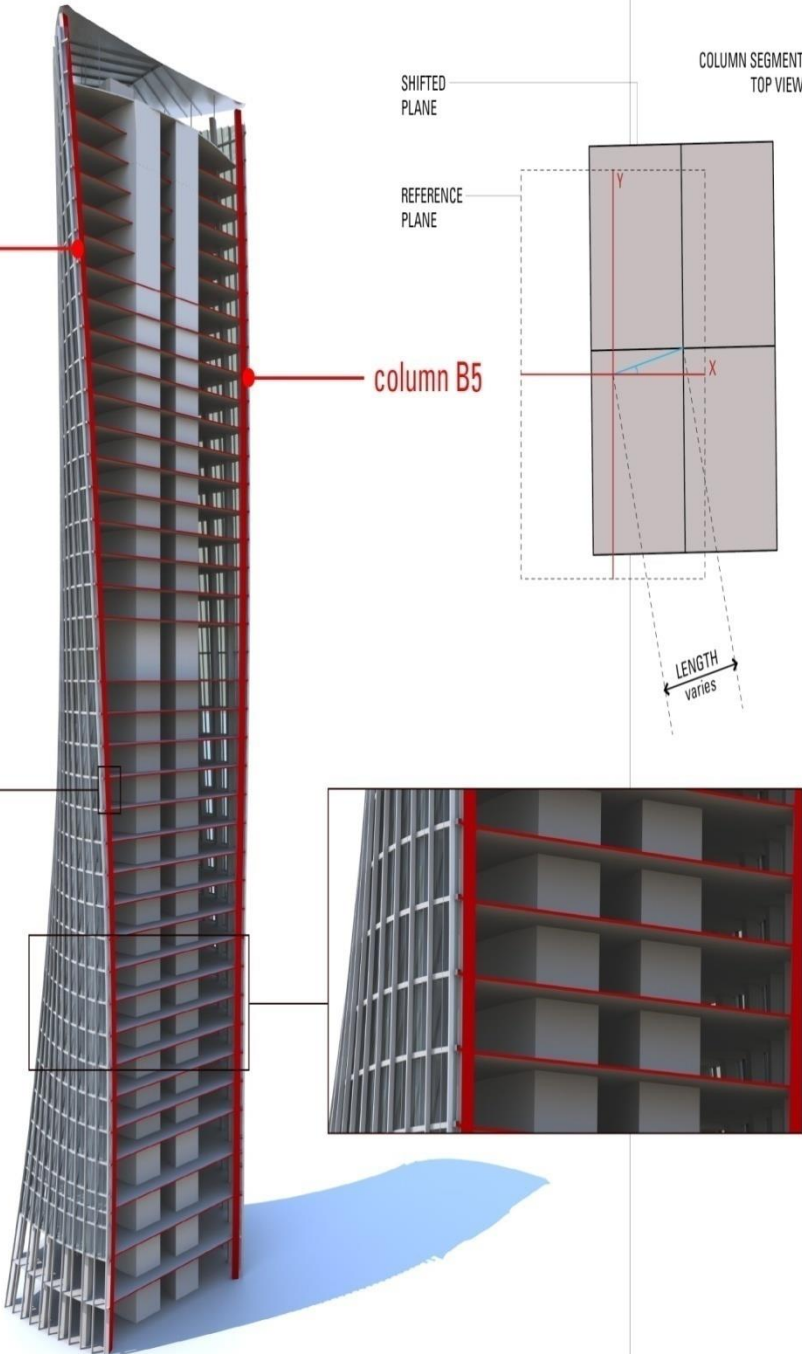


Courtesy of Arup Jururunding Sdn Bhd

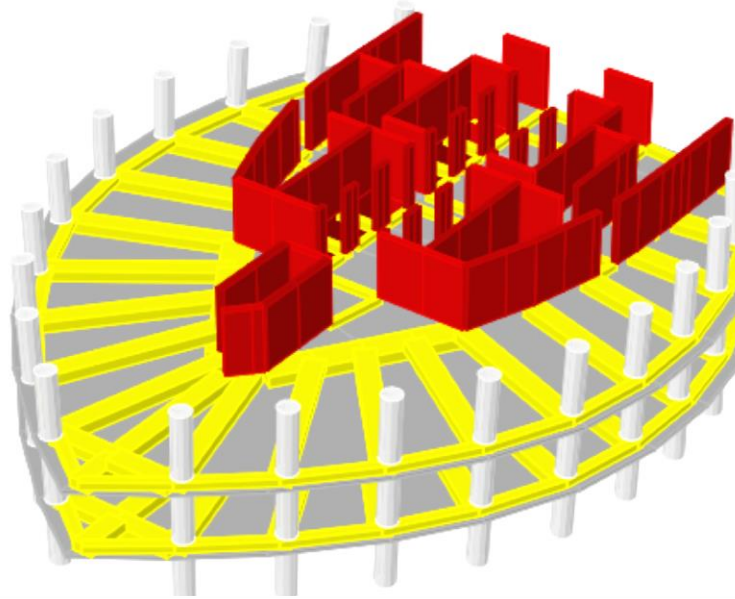
Design Progress
Design Development Stage
Alternative Column
Position



SECTIONAL PERSPECTIVE

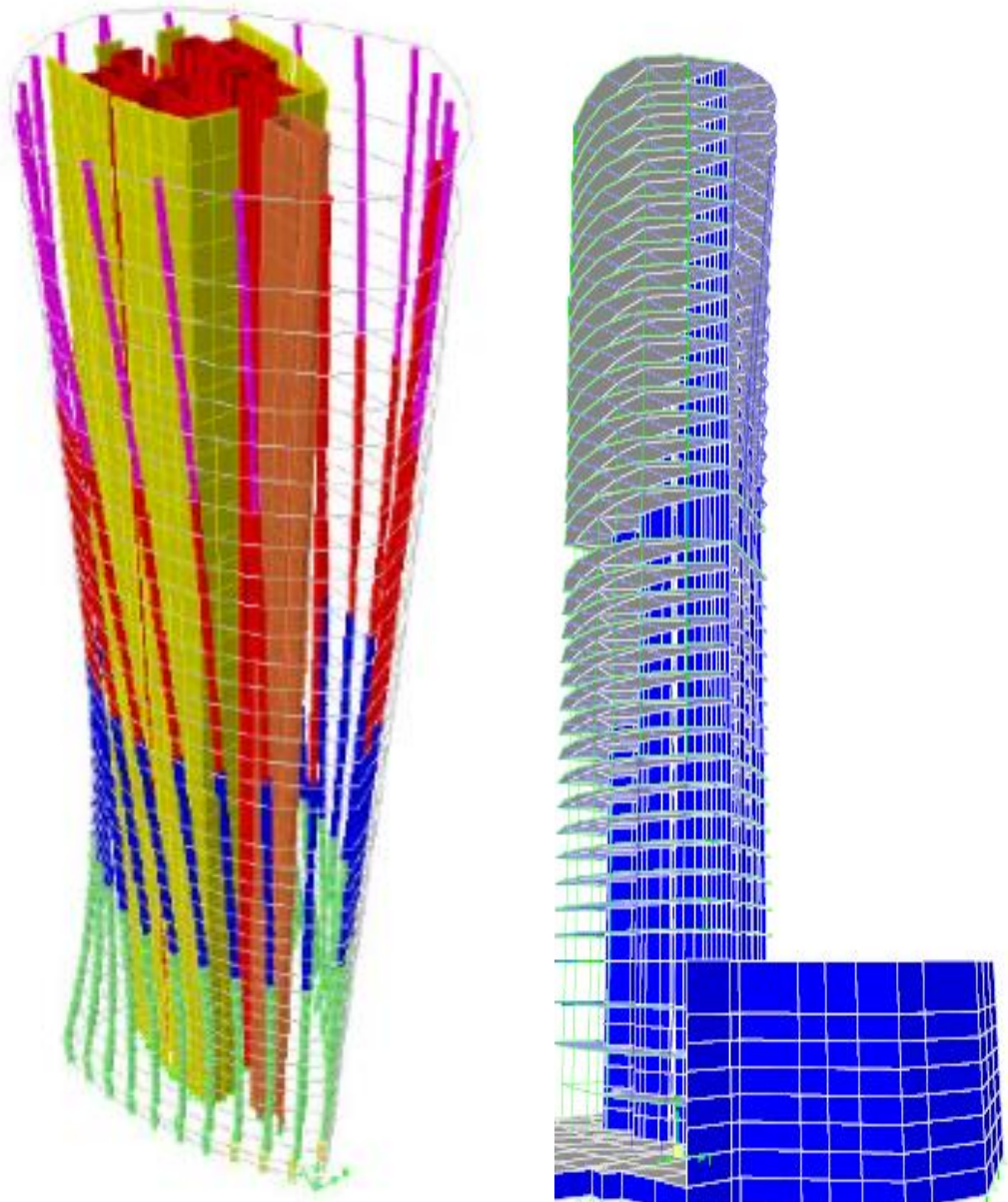
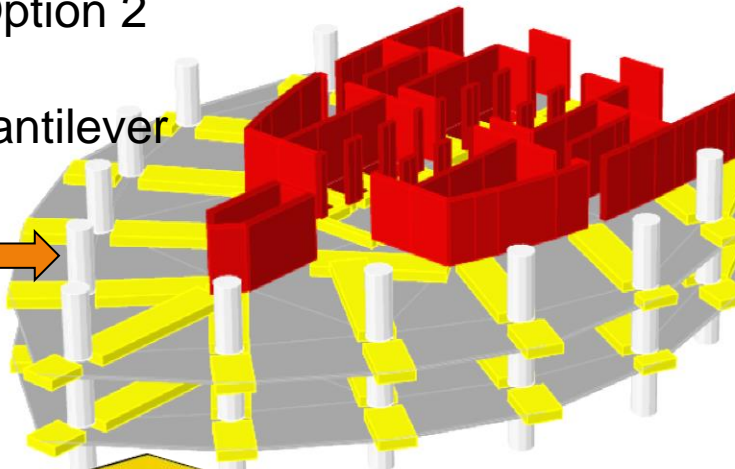


Option 1



Option 2

Cantilever



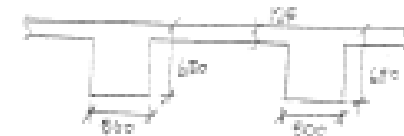
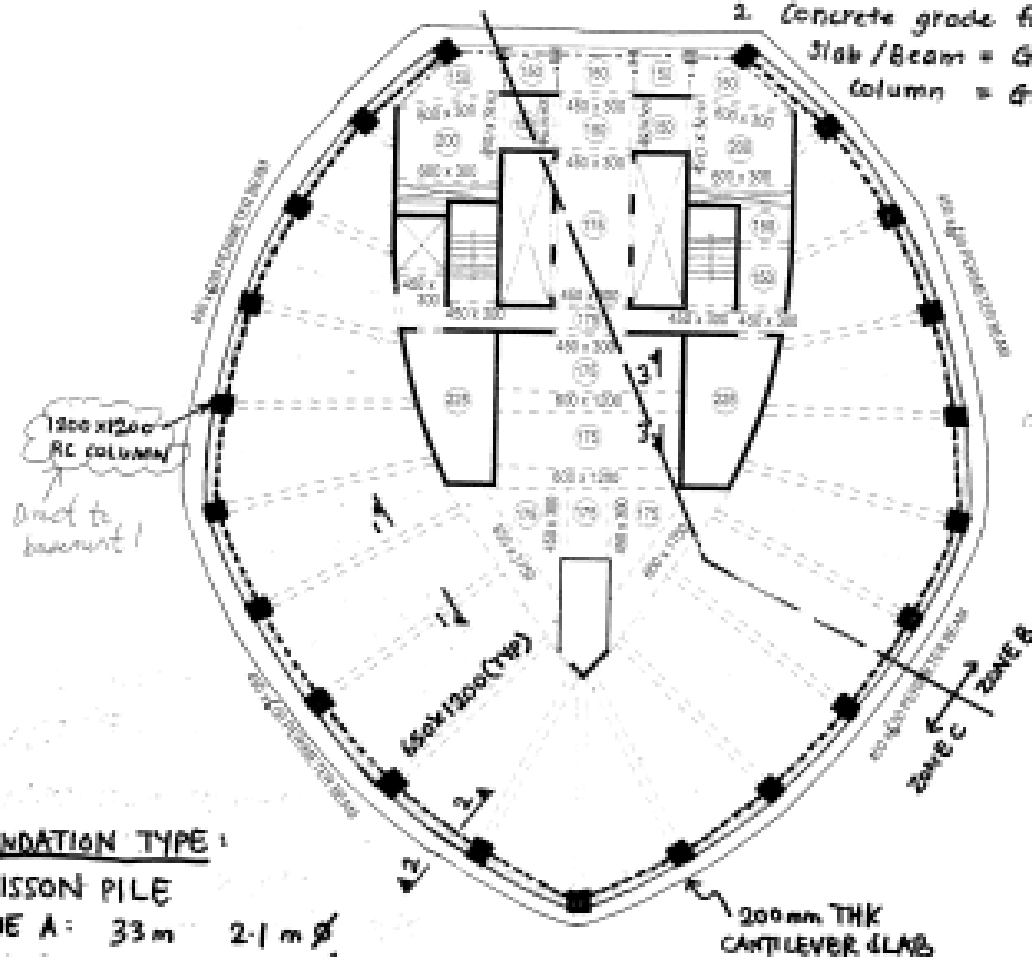
(FIN COLUMN OPTION)

Note :-

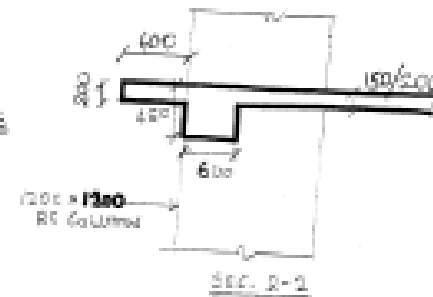
© 2000

1. All slab to be 150mm thick, unless noted otherwise.
2. Concrete grade for :
 Slab / Beam = Grade 40
 Column = Grade 50

9/FEB/2010



26-1-1



Sec. 2-2



SEC. 1-3

Estimated Steel Tonnage:

1. Column $1200 \times 1200 = 470 \text{ kg/m}^3$
2. 150 thk. Slab (TYR) = 100 kg/m^3
 $\frac{150}{200}$
3. 175 thk. Slab = 150 kg/m^3
4. 150 thk. Slab I = 100 kg/m^3
 200 thk. Slab
5. 650×1200 RC Beam (TYR) = 300 kg/m^3
6. 450×1750 RC Beam = 380 kg/m^3
7. 600×1200 RC Beam = 165 kg/m^3
8. 600×300 RC Beam = 130 kg/m^3
9. 450×600 RC Beam = 150 kg/m^3

FOUNDATION TYPE:

CAISSON PILE

ZONE A: 33m 2.1 m ϕ
 ZONE B: 36m 2.1 m ϕ
 ZONE C: 38m 2.1 m ϕ

CALCULATION SHEET

Coursework ref.

DI

Supervising Academic

KSE

Part of Structure

Page Contents

Load Cases

Drawing Ref.

Checked by:

Date

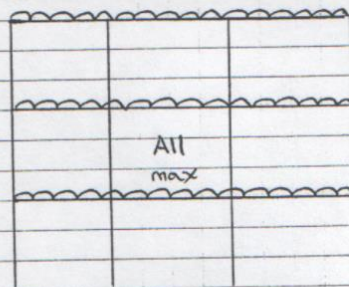
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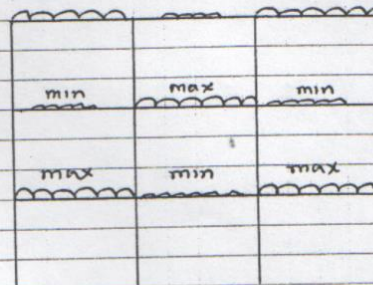
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10/01

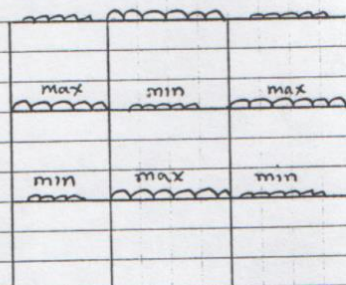
① Max = $1.4D + 1.6L$



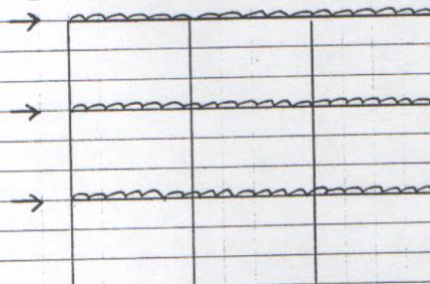
② Max $1.4D + 1.6L$ Min $1.0D$



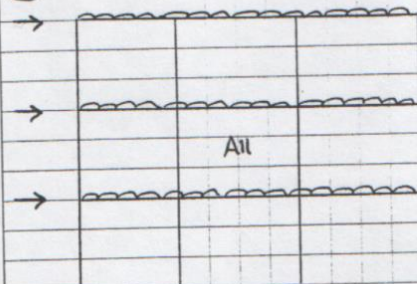
③ As 2



④ $1.2D + 1.2L + 1.2W$



⑤ $1.4W, 1.0D$



⑥ $1.4W, 1.4D$

⑦ Max $1.4D, 1.4W$ Min $1.0D$



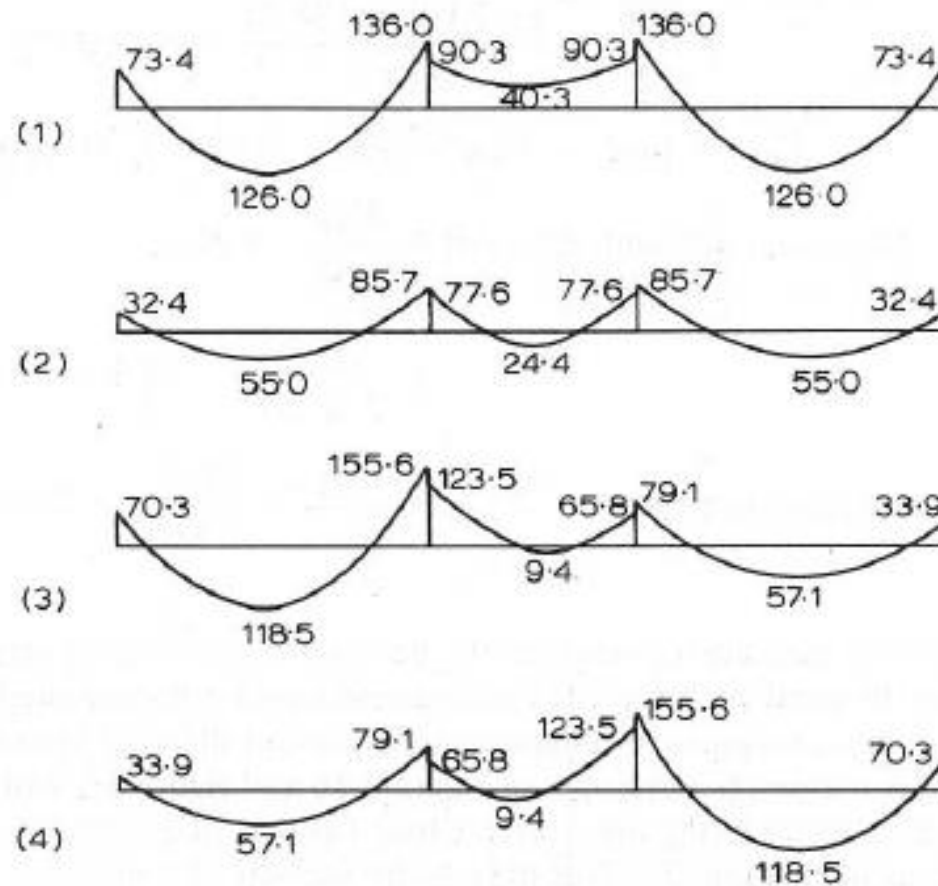


Figure 3.14 *Beam bending-moment diagrams (kN m)*

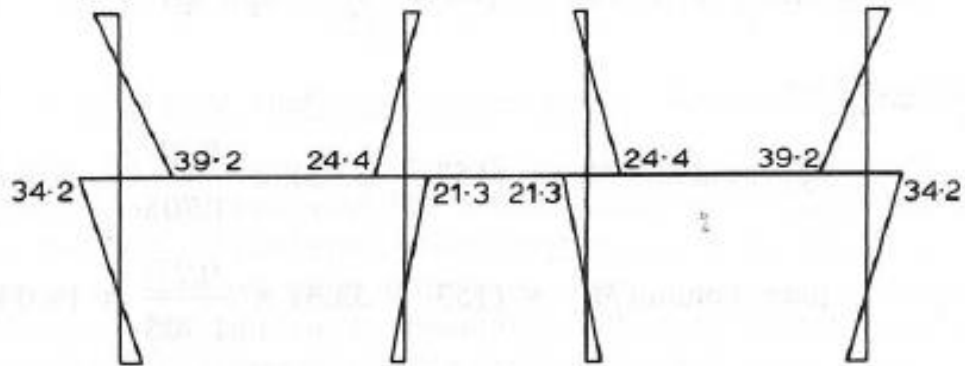
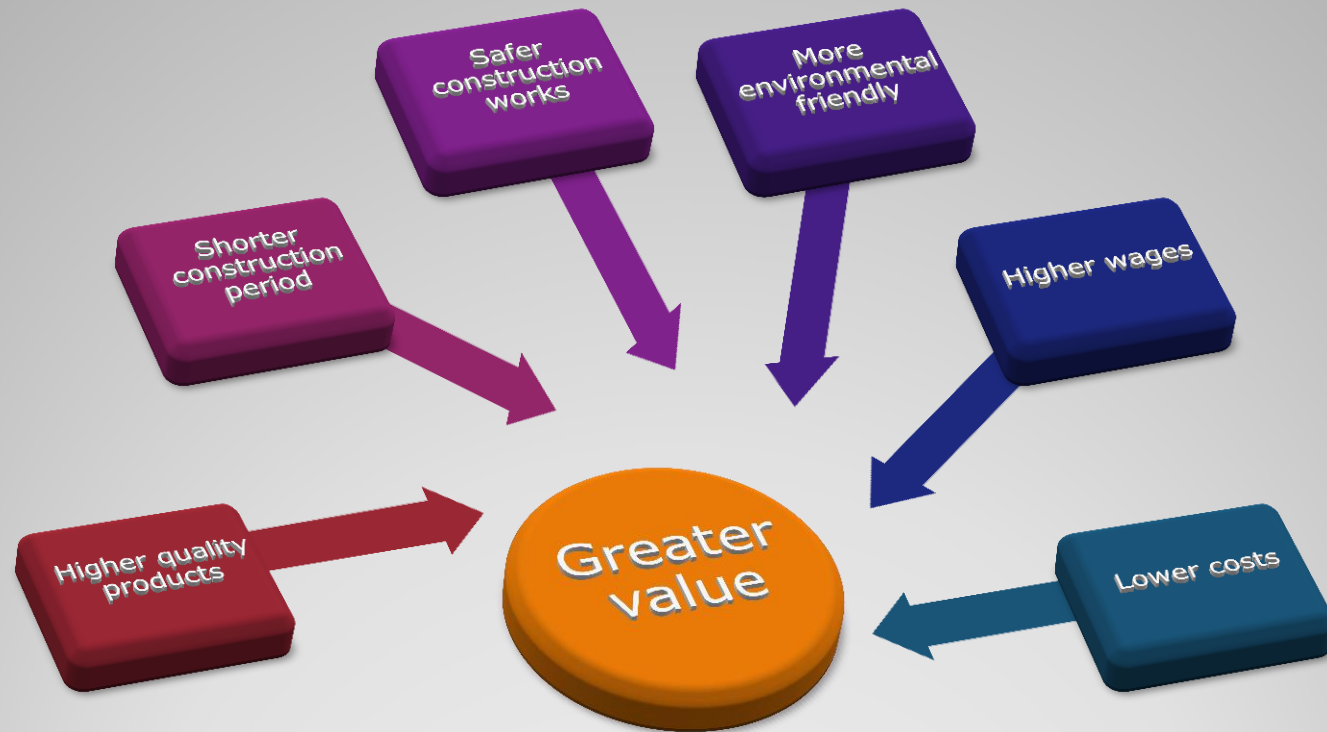


Figure 3.17 Column bending moments (kN m)



Labour
intensive



Mechanisation

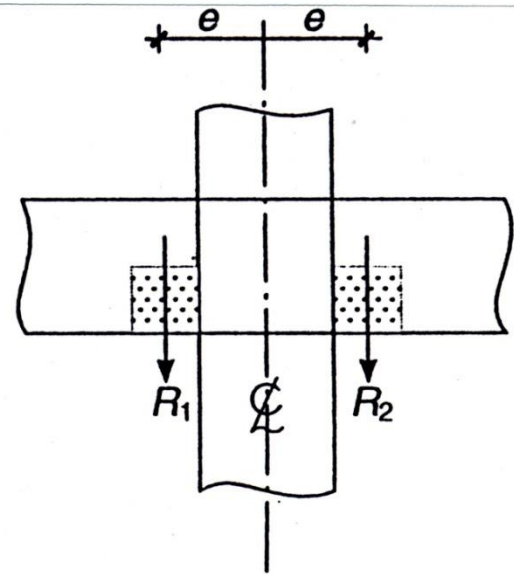
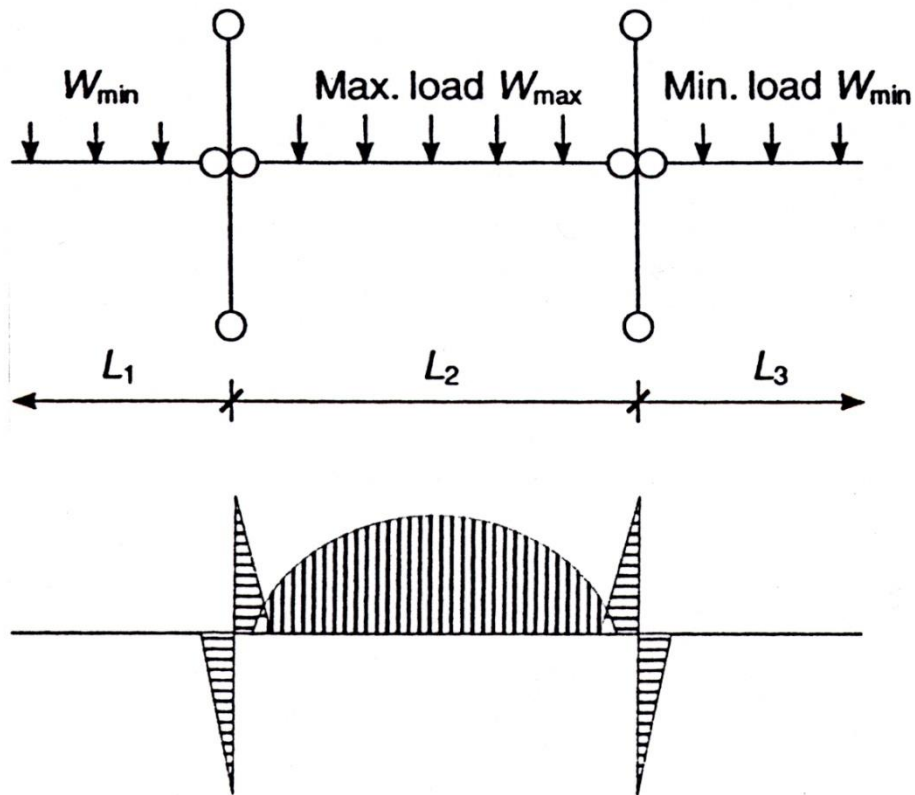


Robotic



Automation



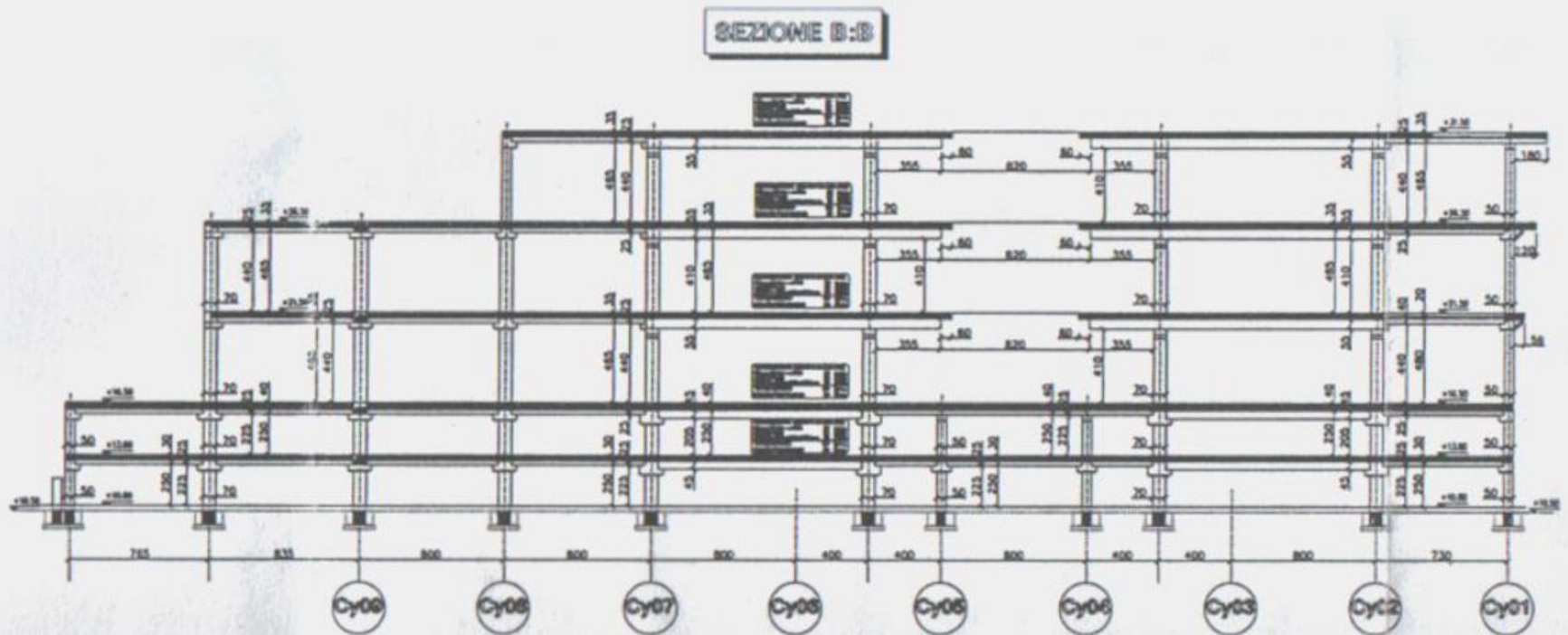


Consequential structural issues – construction by components

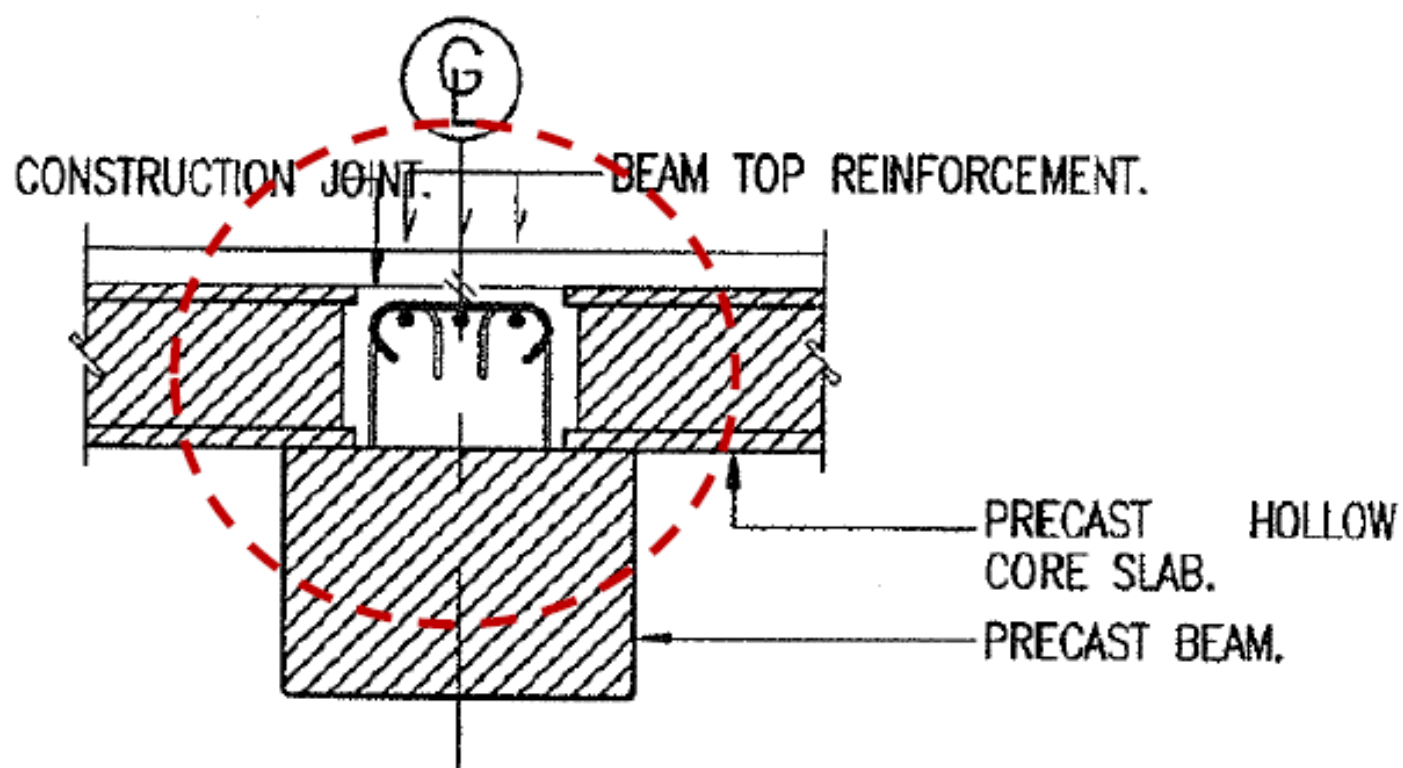


Courtesy of Kim. S. Elliott, PhD

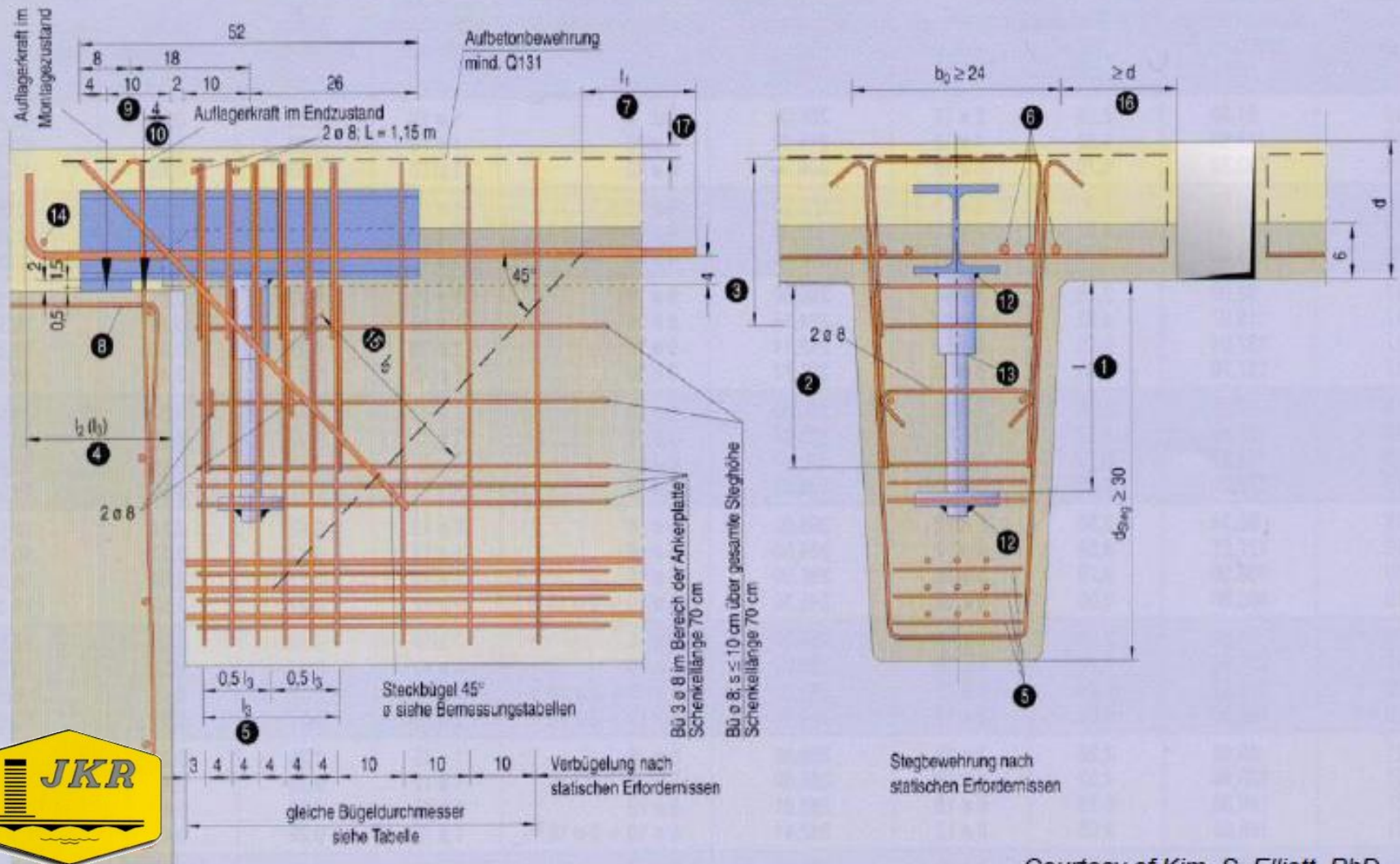
Consequential structural issues – need for assembly drawings



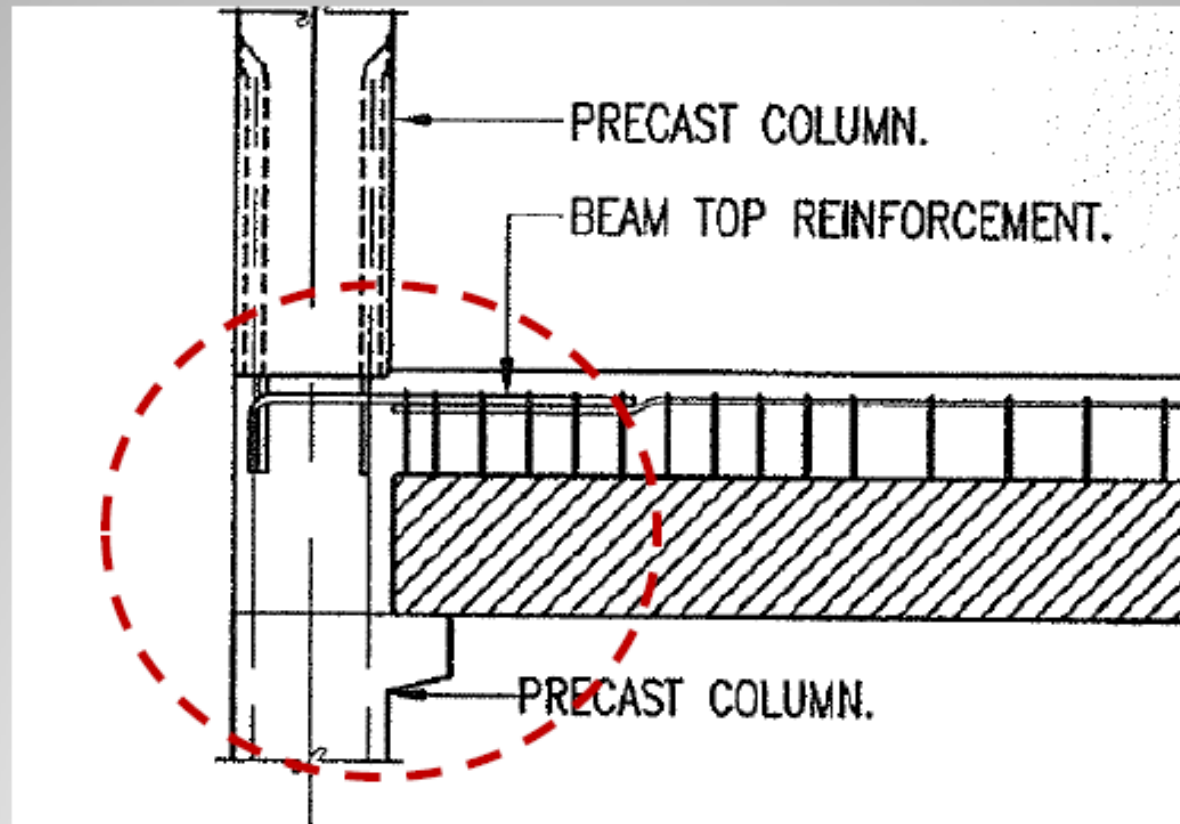
Consequential structural issues – Uncommon member cross-sections



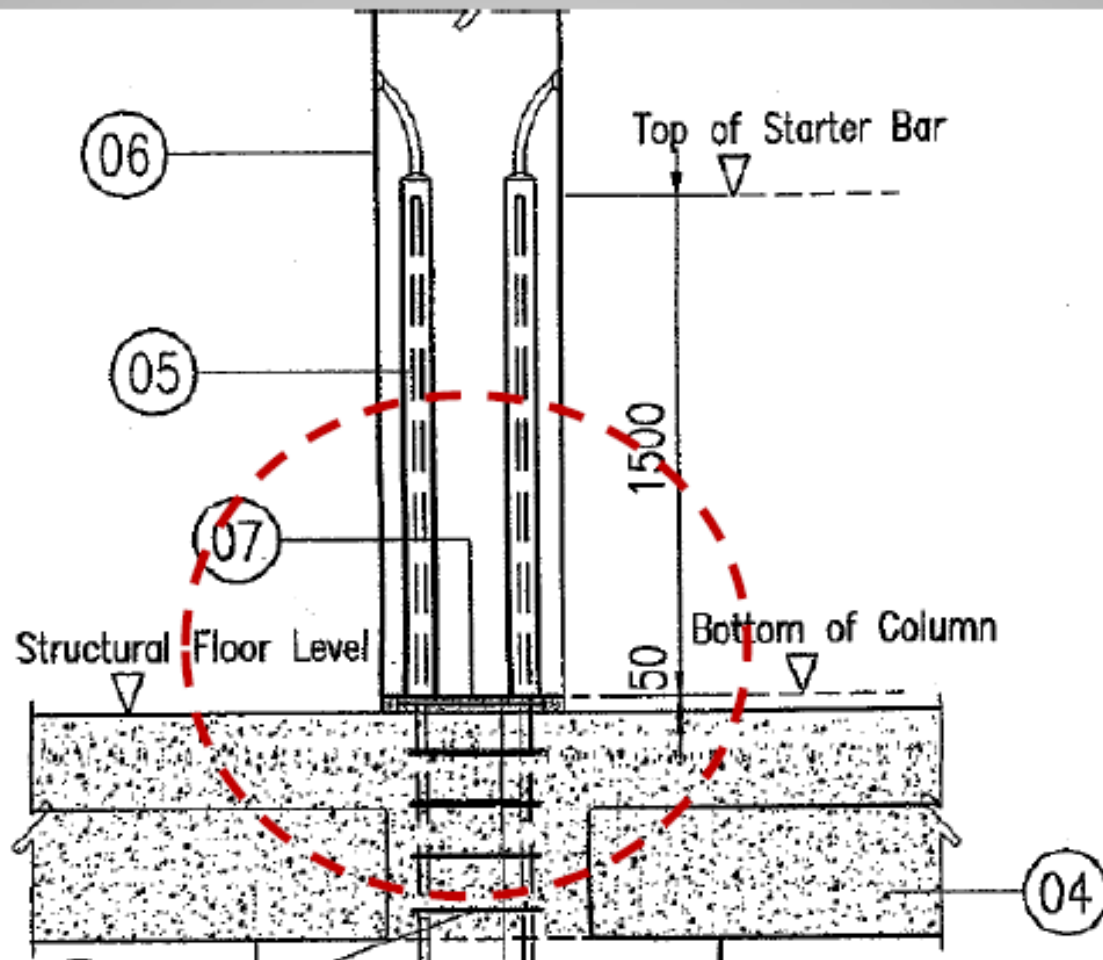
Consequential structural issues – Pinned, semi-rigid and rigid joints

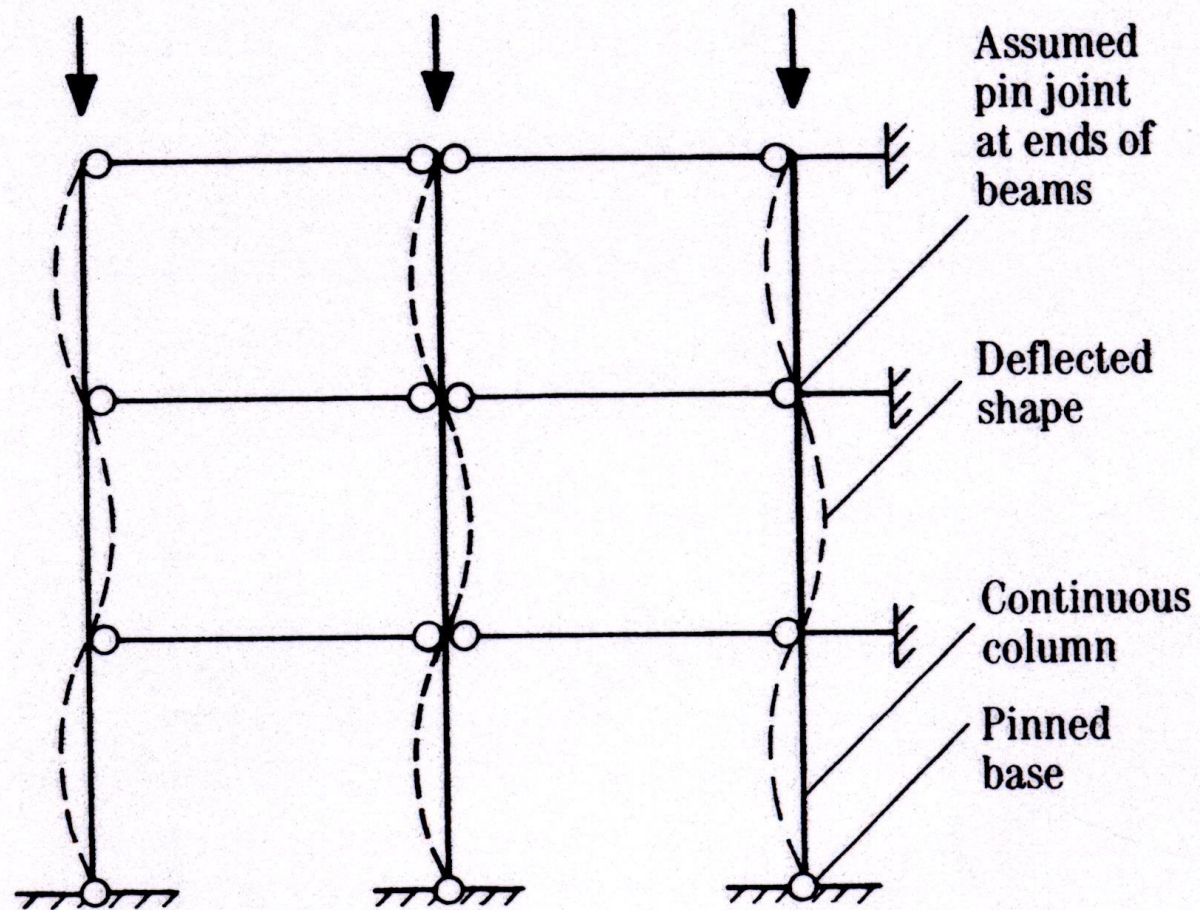


Diverging opinions – pinned or rigid joints?

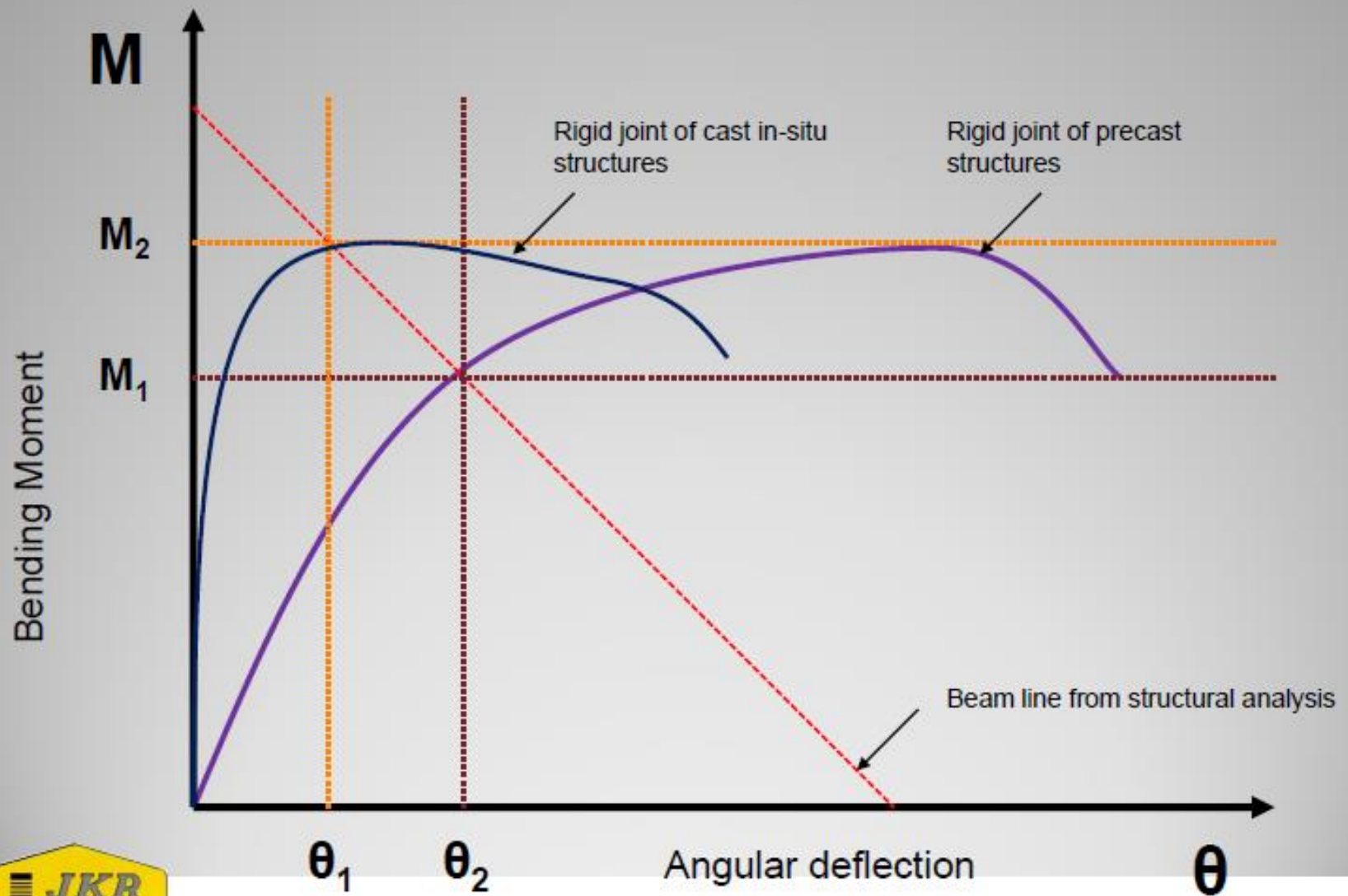


Diverging opinions – pinned or rigid joints?

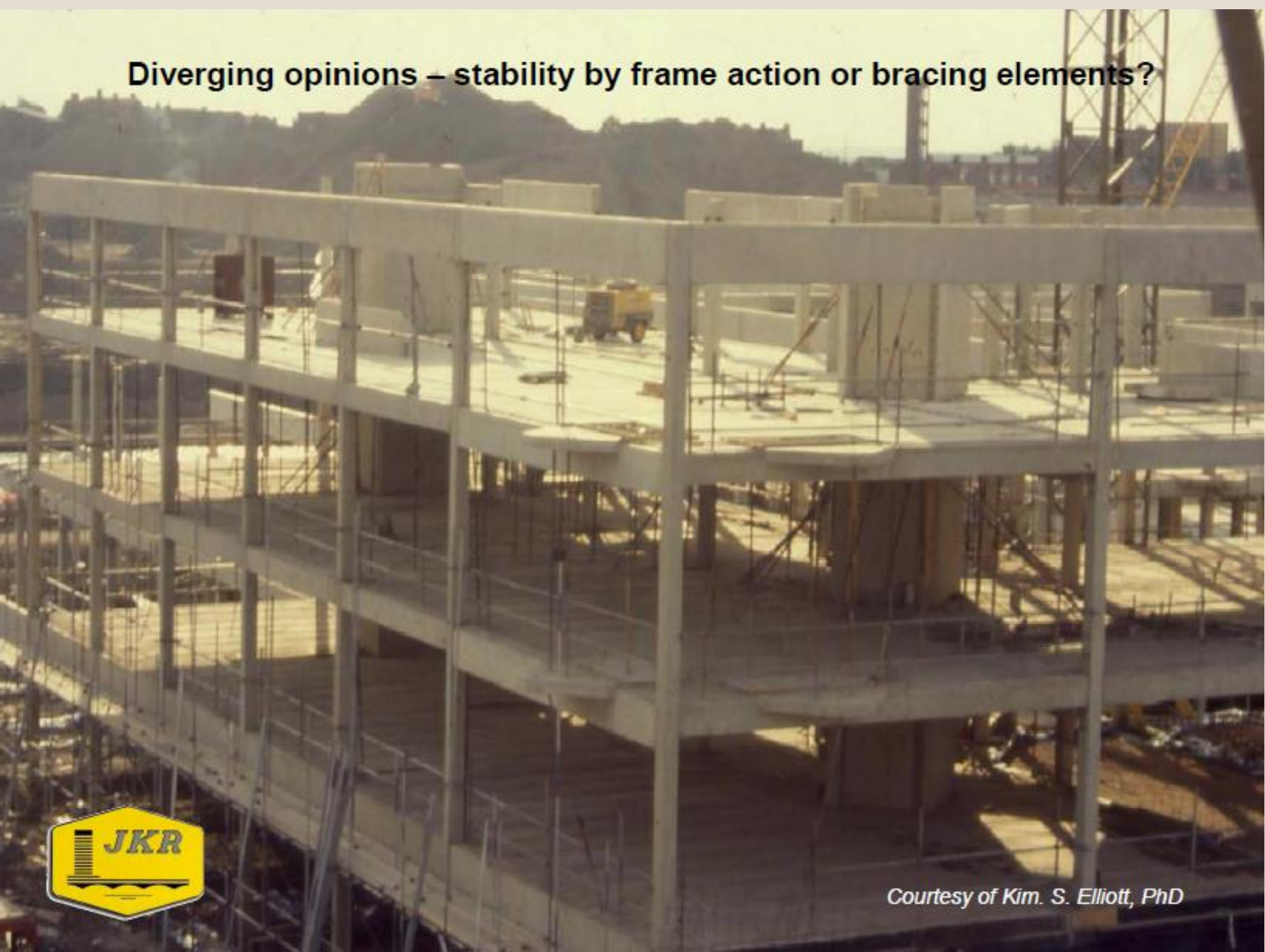




Consequential structural issues – moment against deflection curves



Diverging opinions – stability by frame action or bracing elements?



Courtesy of Kim. S. Elliott, PhD

Conclusions

Construction industry has no choice but to respond in the appropriate manner to the demand from the public to be more efficient, cost effective and environmental friendly.

Breaking down the structures into components that are suitable for manufacturing in the factory and assembled at site (the IBS approach) is the best option to address this demand.

However, lack of consensus on consequential structural issues that emerged as a result of adopting the IBS approach may result in the delivery of less safe structures and thus, reducing public safety.



Thank you

