Pre-Engineered Metal Buildings

What is a Pre-Engineered Metal Building?

This is NOT a “Pre-Engineered Metal Building”!

Nope !

Pre-Engineered Metal Buildings are...

Office buildings

Multi-story

Special use buildings

Places for fun

Big !

Bold !

BEAUTIFUL !

Pre-Engineered Metal Buildings

Shade ‘n Shelter	→	Architecturally Sensitive
Standard Product	→	Market Driven
Simple Box Buildings	→	Complex Shapes

Custom-Engineered Metal Buildings

Shade ‘n Shelter	→	Architecturally Sensitive
Standard Product	→	Market Driven
Simple Box Buildings	→	Complex Shapes

Metal Buildings

ARE

Engineered To Order

What makes it challenging ?

- Building complexity varies
- Volume is seasonal & unpredictable
- Staff learning curve is long
- Competition is fierce - price and timing

Our goals…..

- **Reduce time…Front Door to Shop Floor**

  (time-to-money)
- **Reduce back-charges**

  (keep the money)
- **Reduce staff learning curve**

  (save the money)
- **Minimize impact of complex work**

  (improve revenue opportunity)

Our overall strategy…..

- “Synergize” the customer

  …..design/estimating/sales software
- Use innovative software innovatively

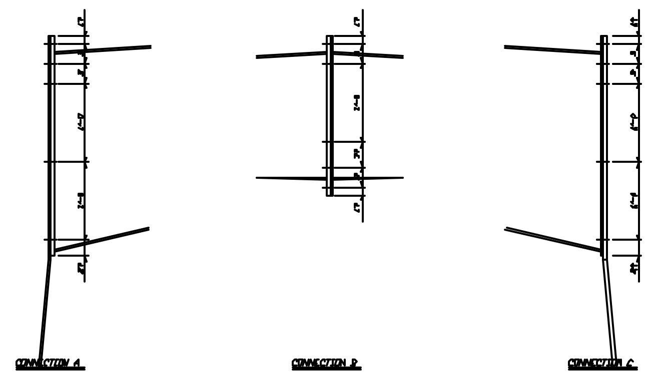
  …..leverage capability and commonality
- Attack the biggest opportunity first

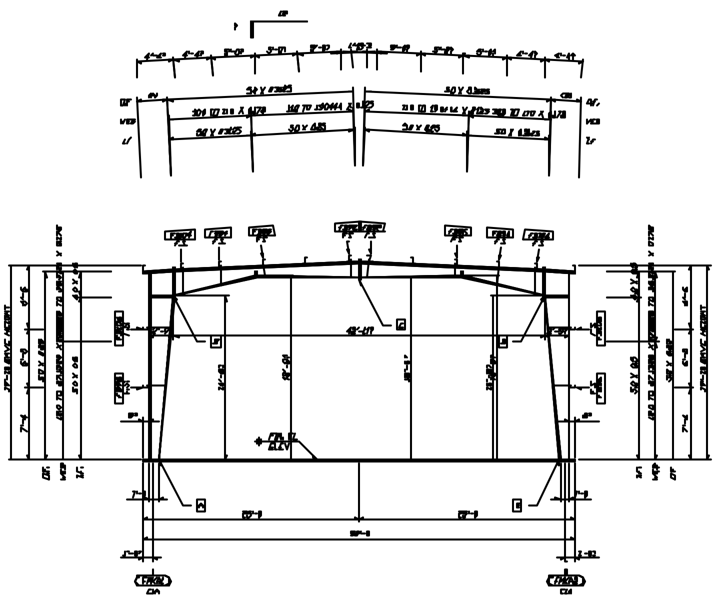
Our focus…Design/Detailing

- Most calendar time expended
- Largest work-group
- Longest knowledge/skill learning curve
- Most negative impact due to complexity
- Most negative impact due to size of job

Our vision....

- One person - one job
- One system - all complexities
- One system - all inputs/outputs
- Automate 90% of all product knowledge
- All design work in 3-D





CROSS SECTION AT FRAME LINES

PLATE SIZES
(A) 3.0 X 0.3125
(B) 3.0 X 0.3125

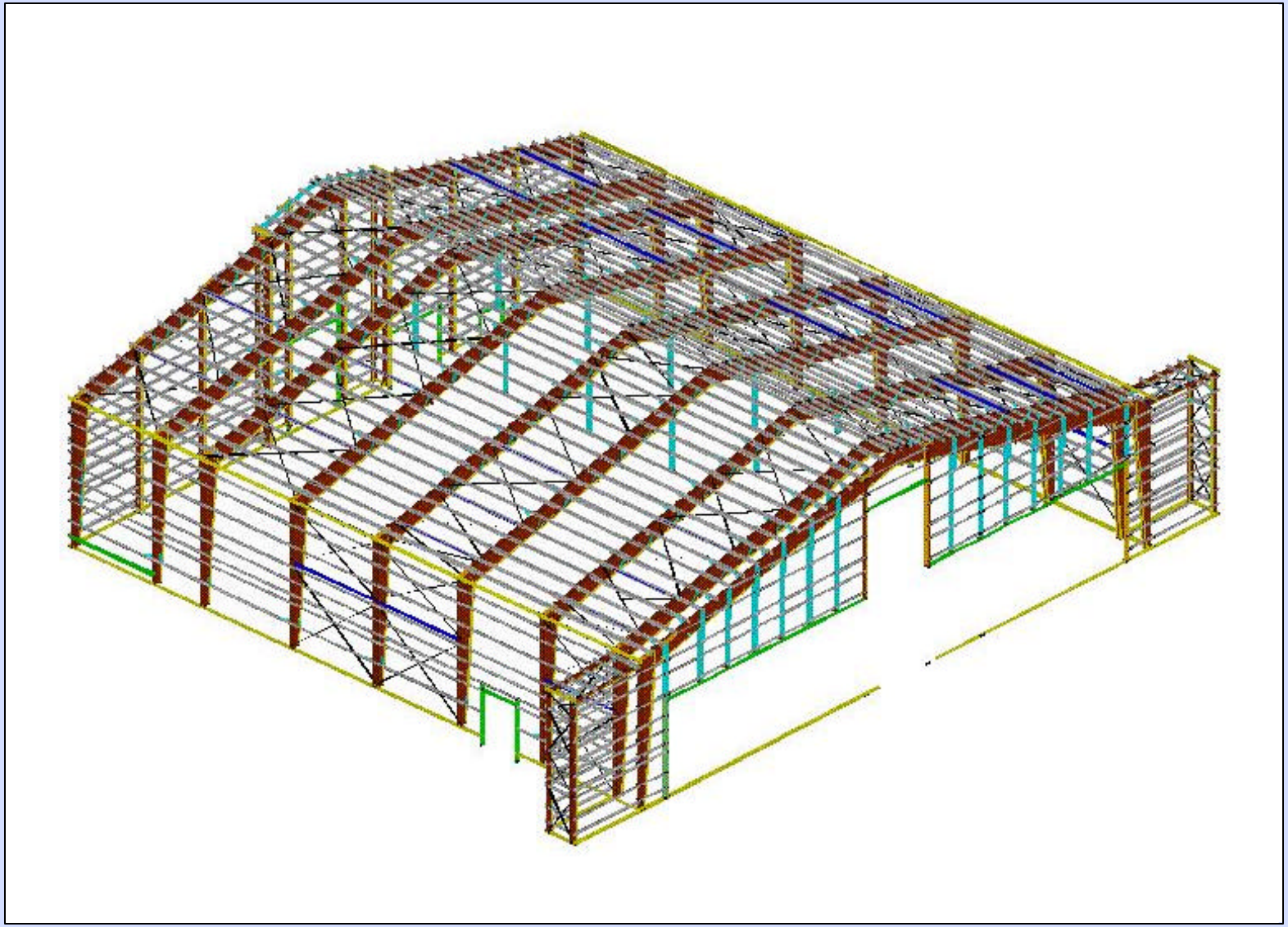
GENERAL NOTES
FRAME CLEARANCES SHOWN ARE APPROXIMATE AND MAY VARY DUE TO CONDITIONS (DEFLECTION)

VERTICAL CLEARANCE DIMENSIONS ARE FROM FINISHED FLOOR REFERENCE ELEVATION

	PLATE SIZE TABLE		SPLICE BOLT TABLE			
CONN.	LOW SIDE	HIGH SIDE	QTY. SIZE	TYPE	HARDENED WASHERS	BEVELED WASHERS
A	6.0 X 0.375 X 1'-4					
B	6.0 X 0.5 X 2'-[illegible]					
C	[illegible]	[illegible]	[illegible]	A325 B&N	0	0
D	6.0 X 0.5 X 2'-[illegible]	6.0 X 0.5 X [illegible]	[illegible]	A325 B&N	0	0
E	[illegible] X 0.375 X 2'-2					

TABLE OF ABBREVIATIONS
B&N = BOLT AND NUT
NS = NEAR SIDE
FS = FAR SIDE

DRAWN	DATE	REGIONAL LOGO AREA	JOB NO.
CHECKED	DATE	CUSTOMER: XXX XXX XXX XXX XXX — SHIP TO: XXX XXX XXX XXX XXX	DEALER MBMA
ENGINEER	DATE		SHEET NO.
SCALE			



Our Approach....

COMPUTER AIDED DESIGN? YES!

……BUT MORE……

COMPUTER AUTOMATED DESIGN?

Our tools....

Knowledge-Based Engineering Software

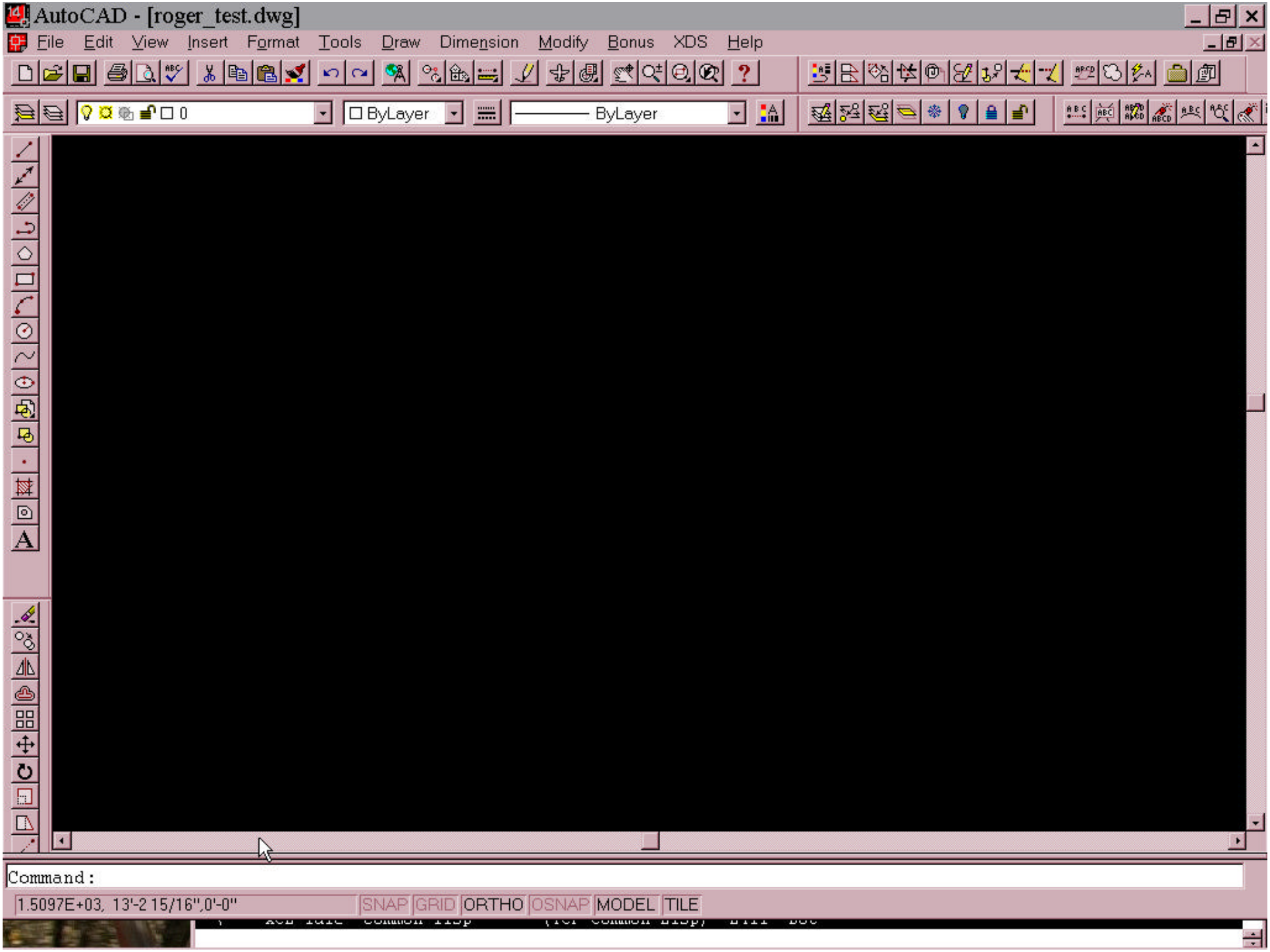
(Design ++® by Design Power, Inc.)

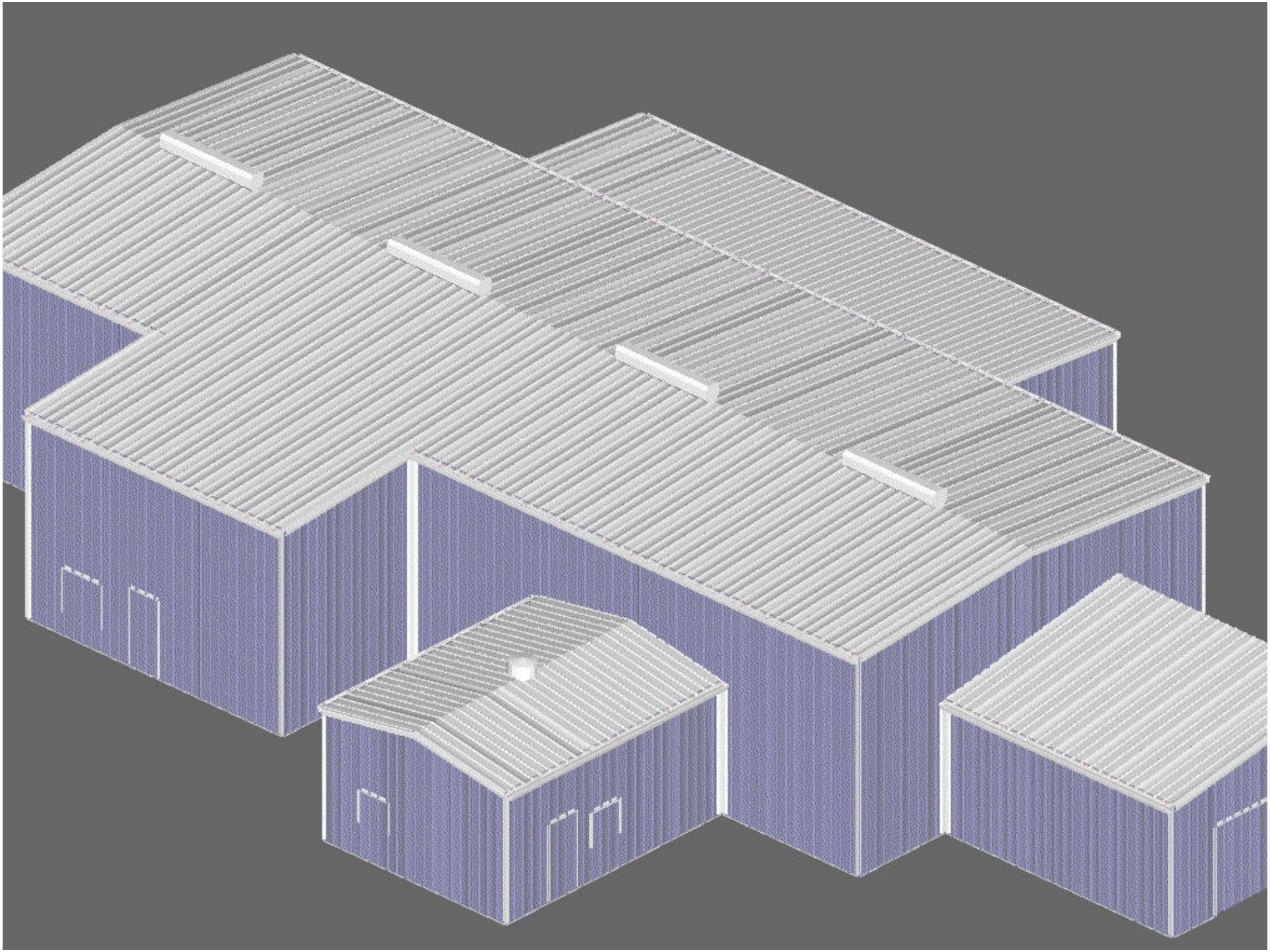
Computer Aided Drawing

(AutoCAD® by Autodesk, Inc.)

Knowledge-based Modeling

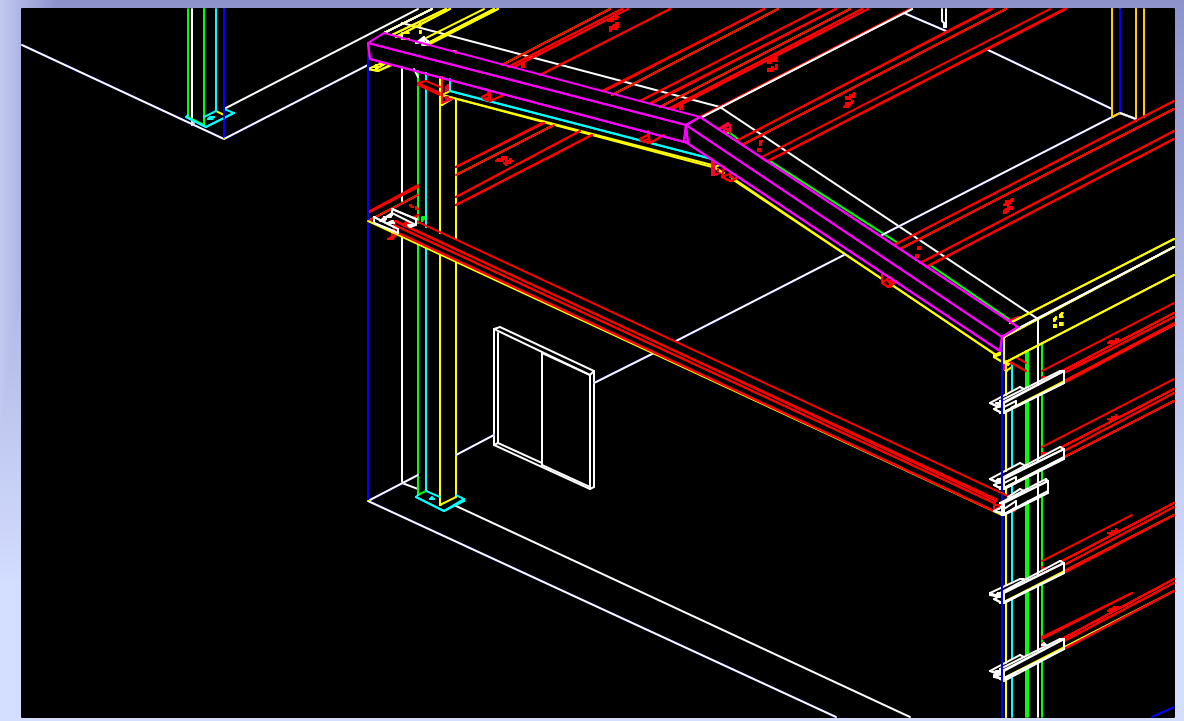
- Define custom objects
- Rule editor and engine
  - captures/applies domain knowledge
- Tracks object dependencies
- Integrates with legacy design pgms
- Integrates with AutoCAD


AutoCAD - [roger_test.dwg]
File Edit View Insert Format Tools Draw Dimension Modify Bonus XDS Help
0
ByLayer
ByLayer
Command:
1.5097E+03, 13'-2 15/16",0'-0"
SNAP GRID ORTHO OSNAP MODEL TILE



Computer Automated Design

Effect of changes



Change :
Move standard window from one wall to another.

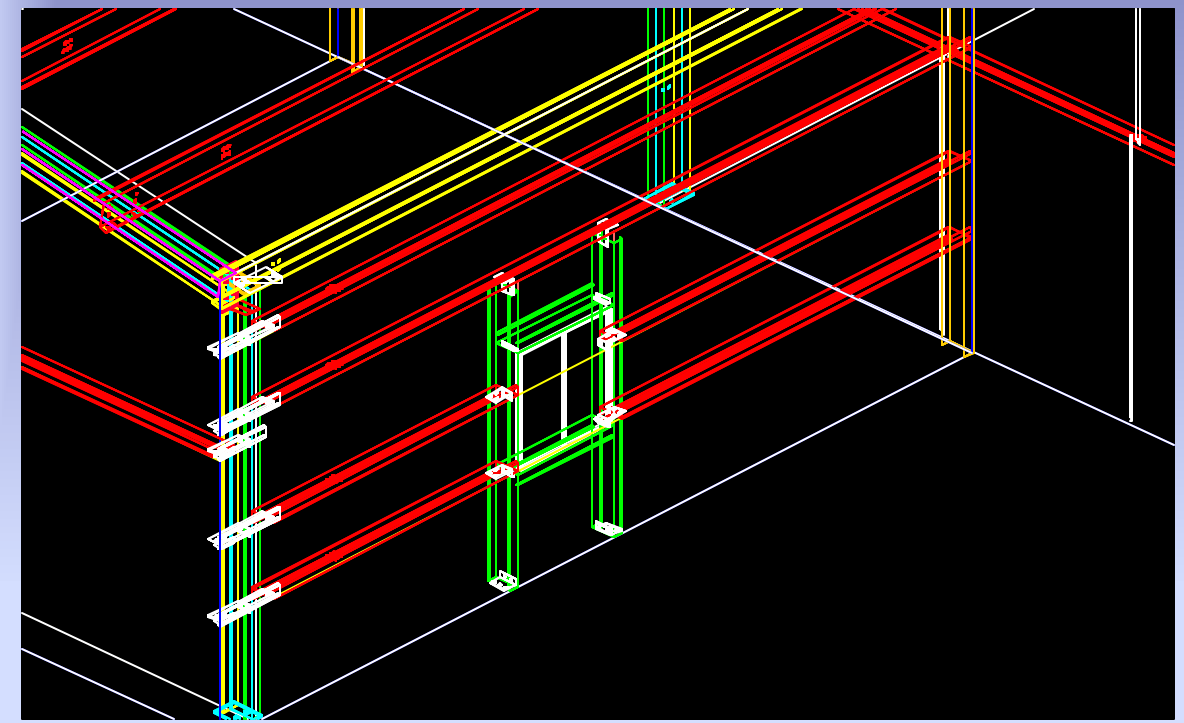
Condition:
Window is currently in Short Wall and supported by Panels.

Solution:
Model recognizes changes and recalculates ONLY changed parts, exactly and ready to manufacture.

Problem :
New wall is longer and has additional Secondary Framing, which will foul window opening

Computer Automated Design

Effect of changes



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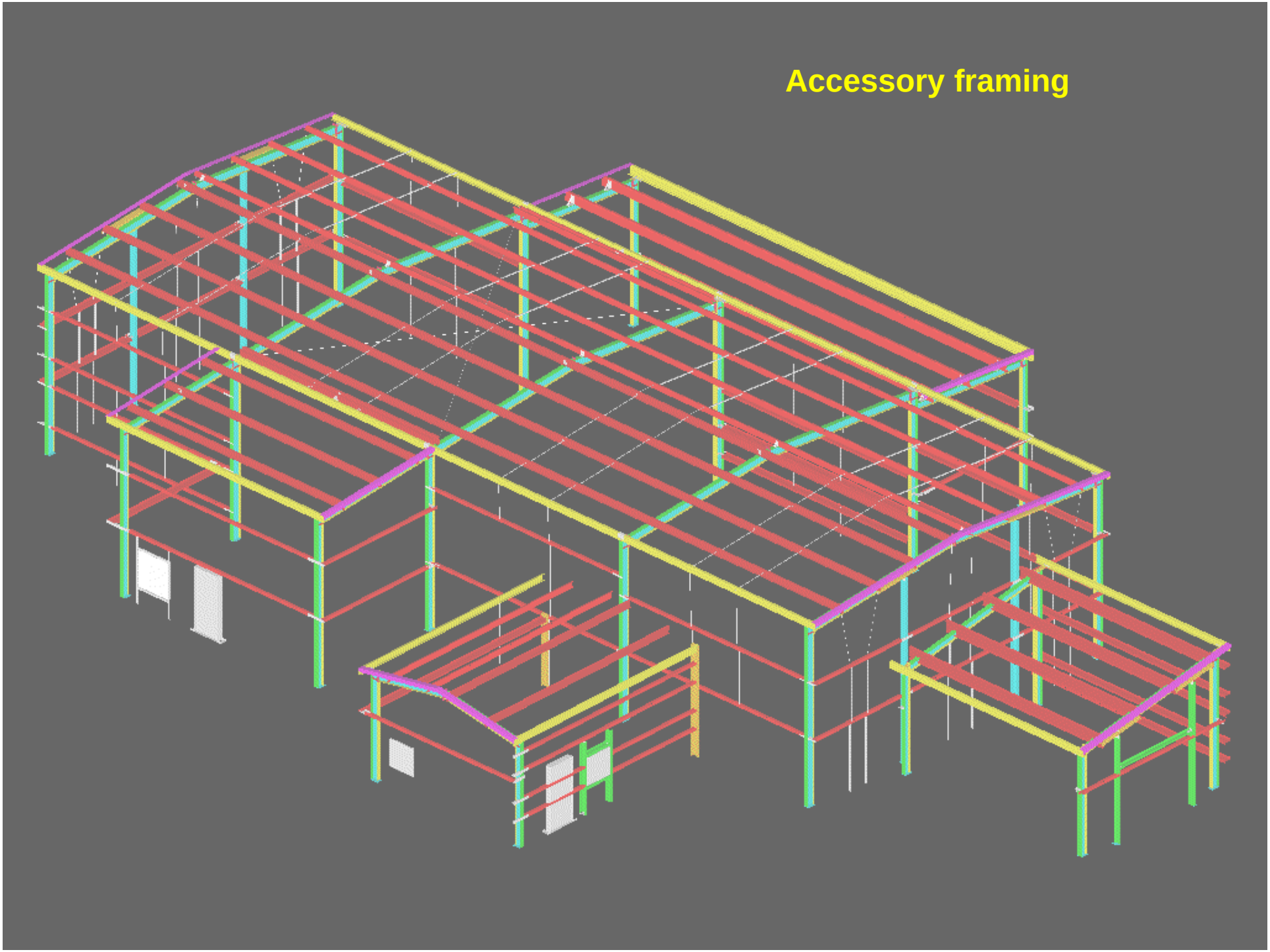
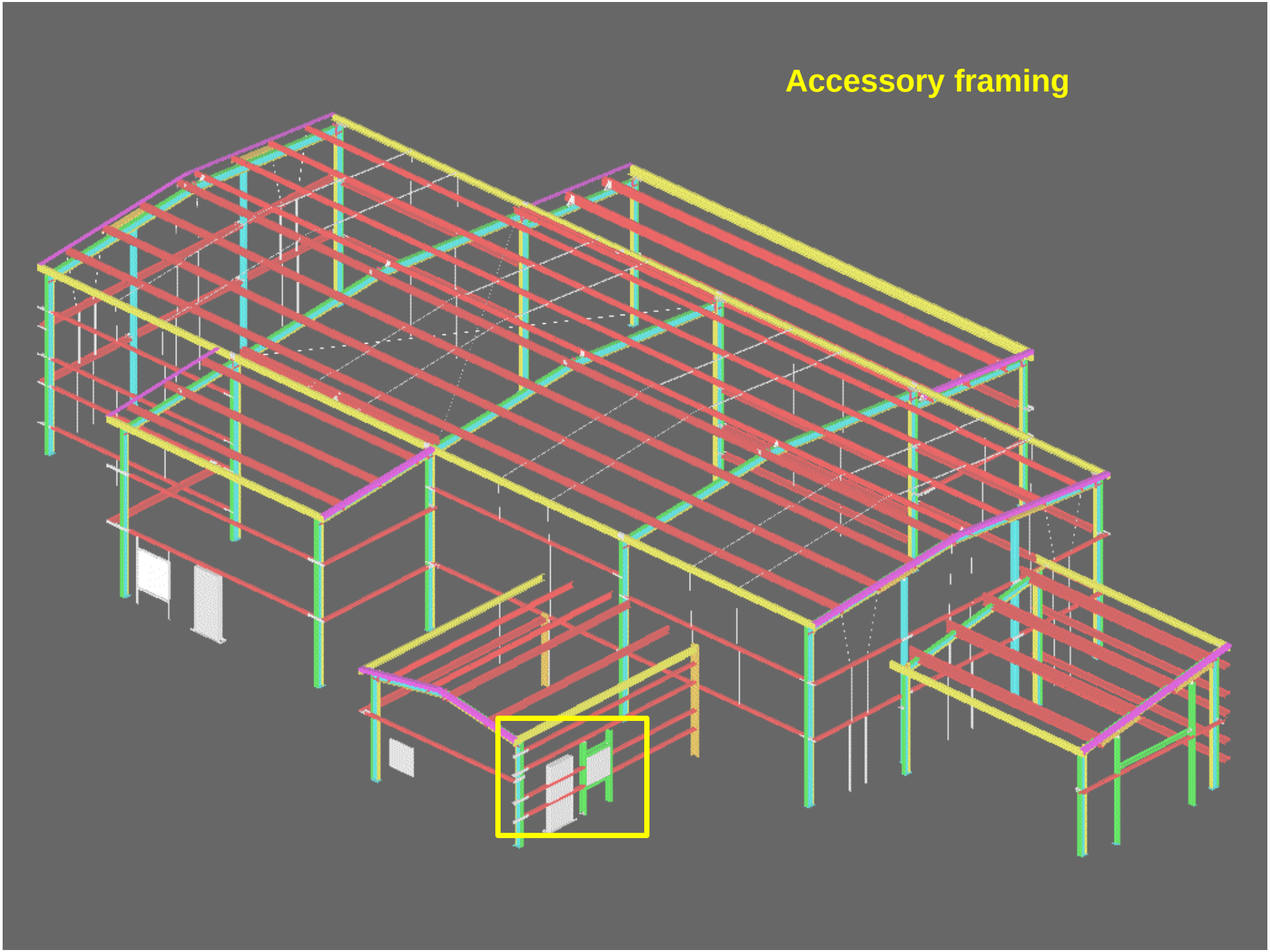
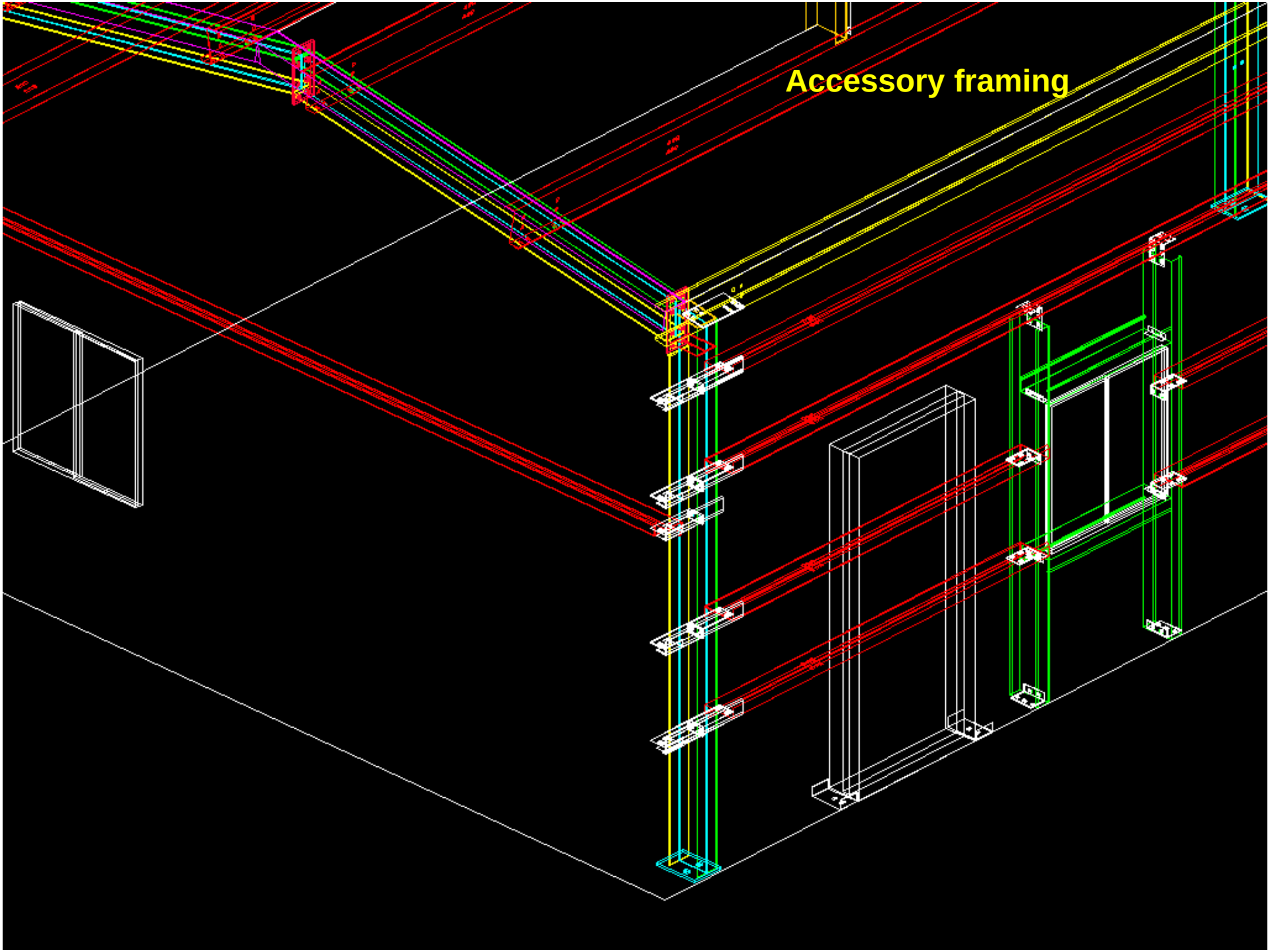

Accessory framing


Accessory framing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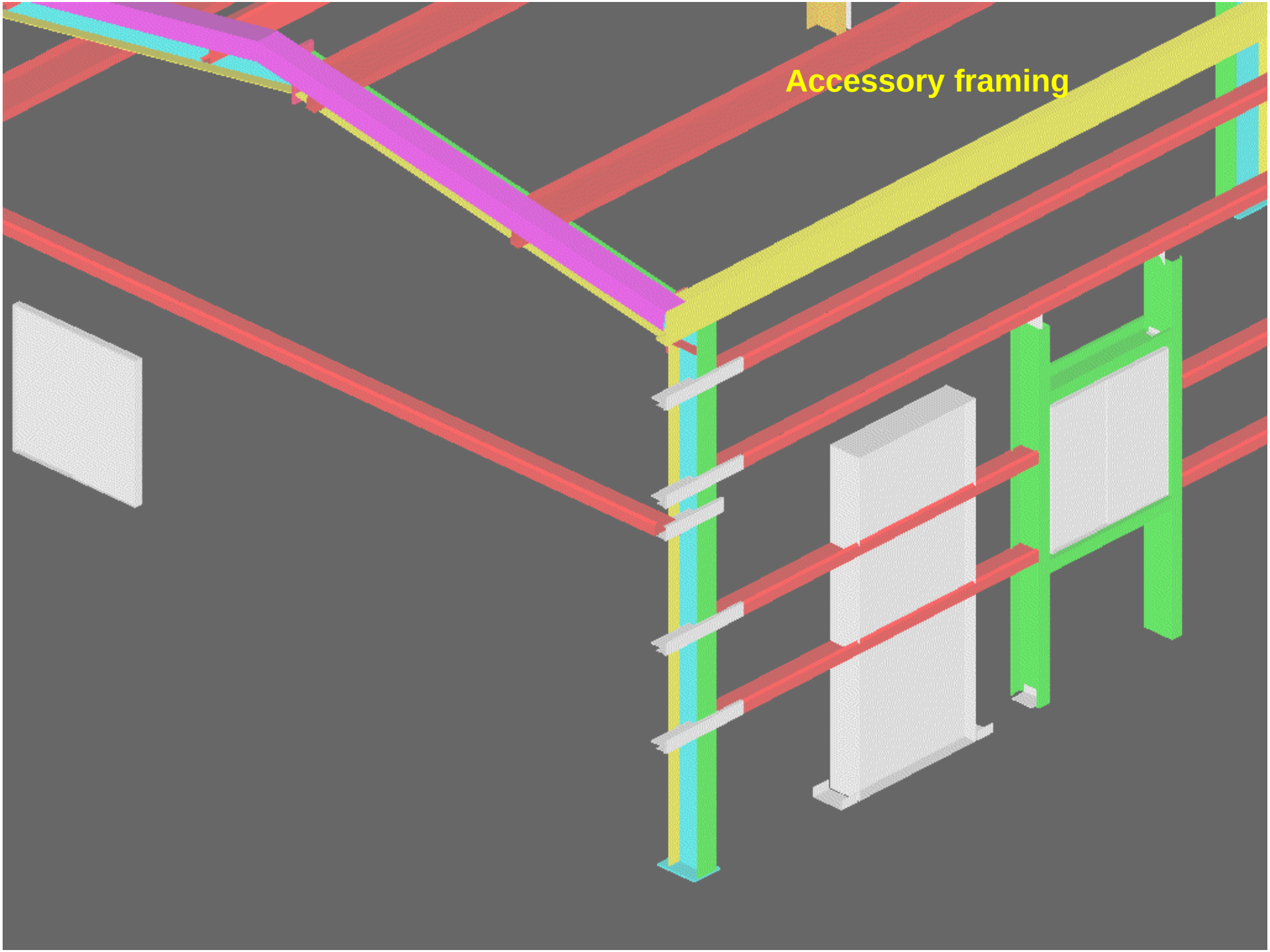
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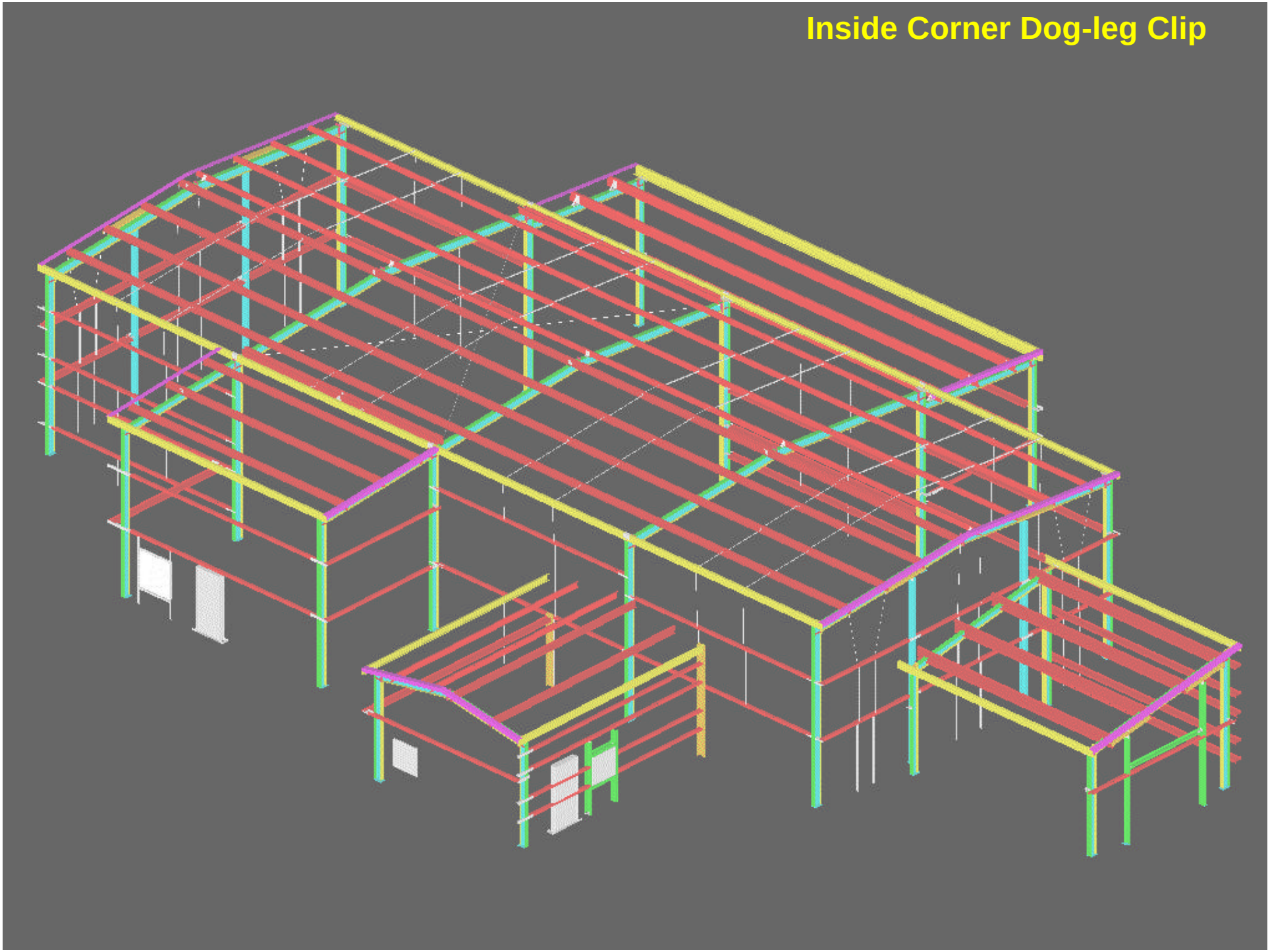
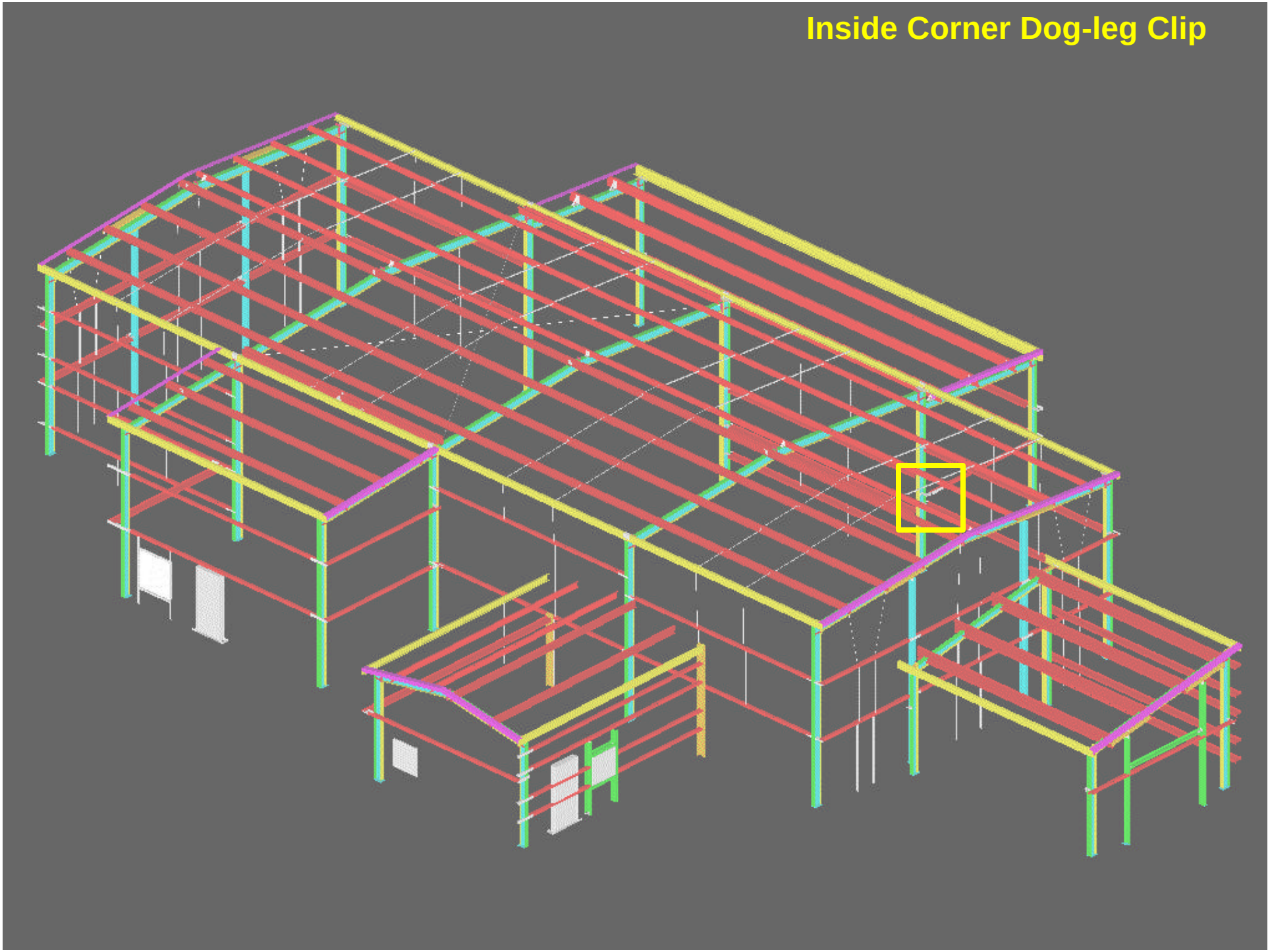
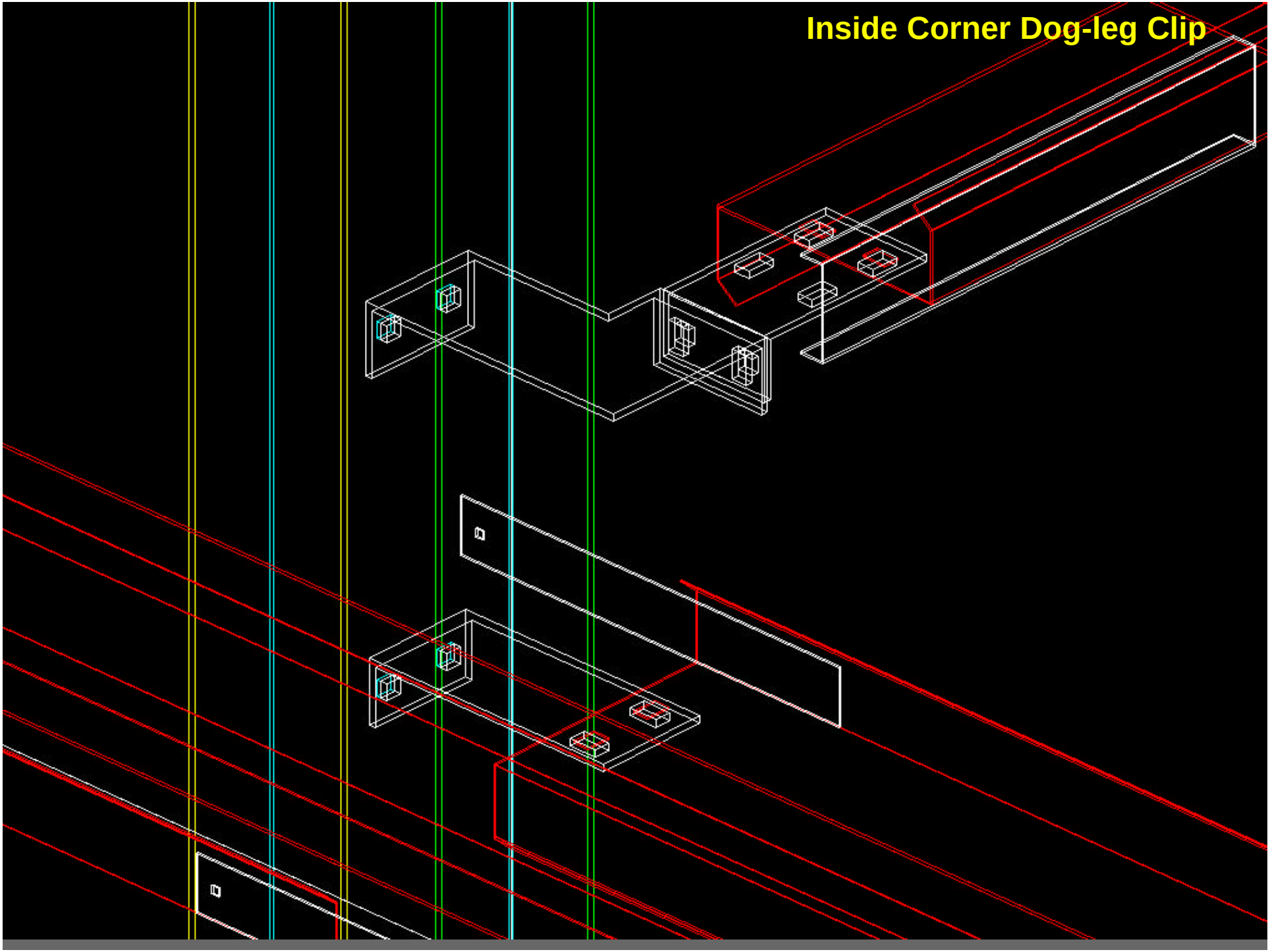

Inside Corner Dog-leg Clip


Inside Corner Dog-leg Clip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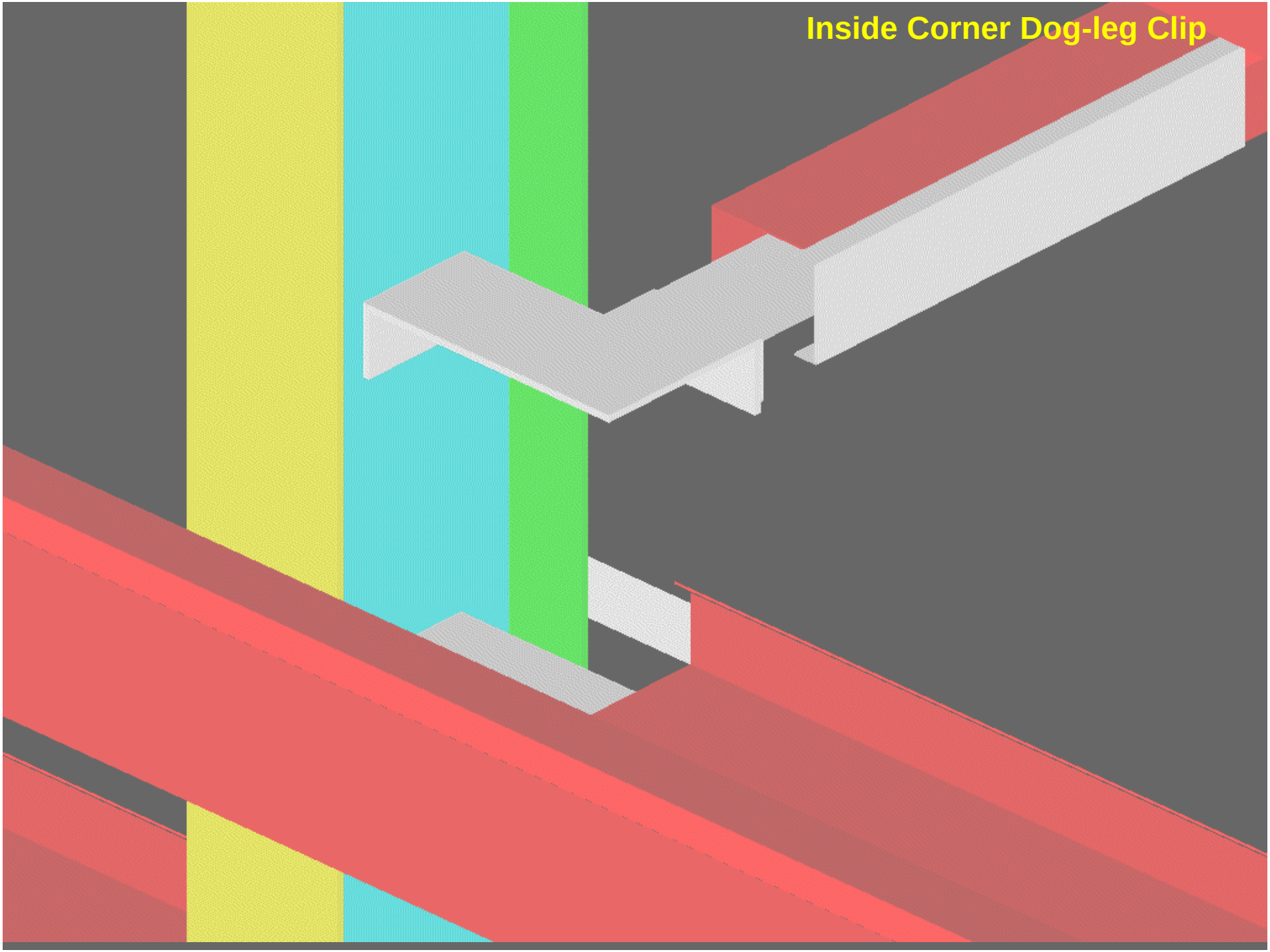

Inside Corner Dog-leg Clip

Why not use parametric CAD tools?

Typical 90 degree corner connection requires about 3,840 patterns

3 - Member Depths

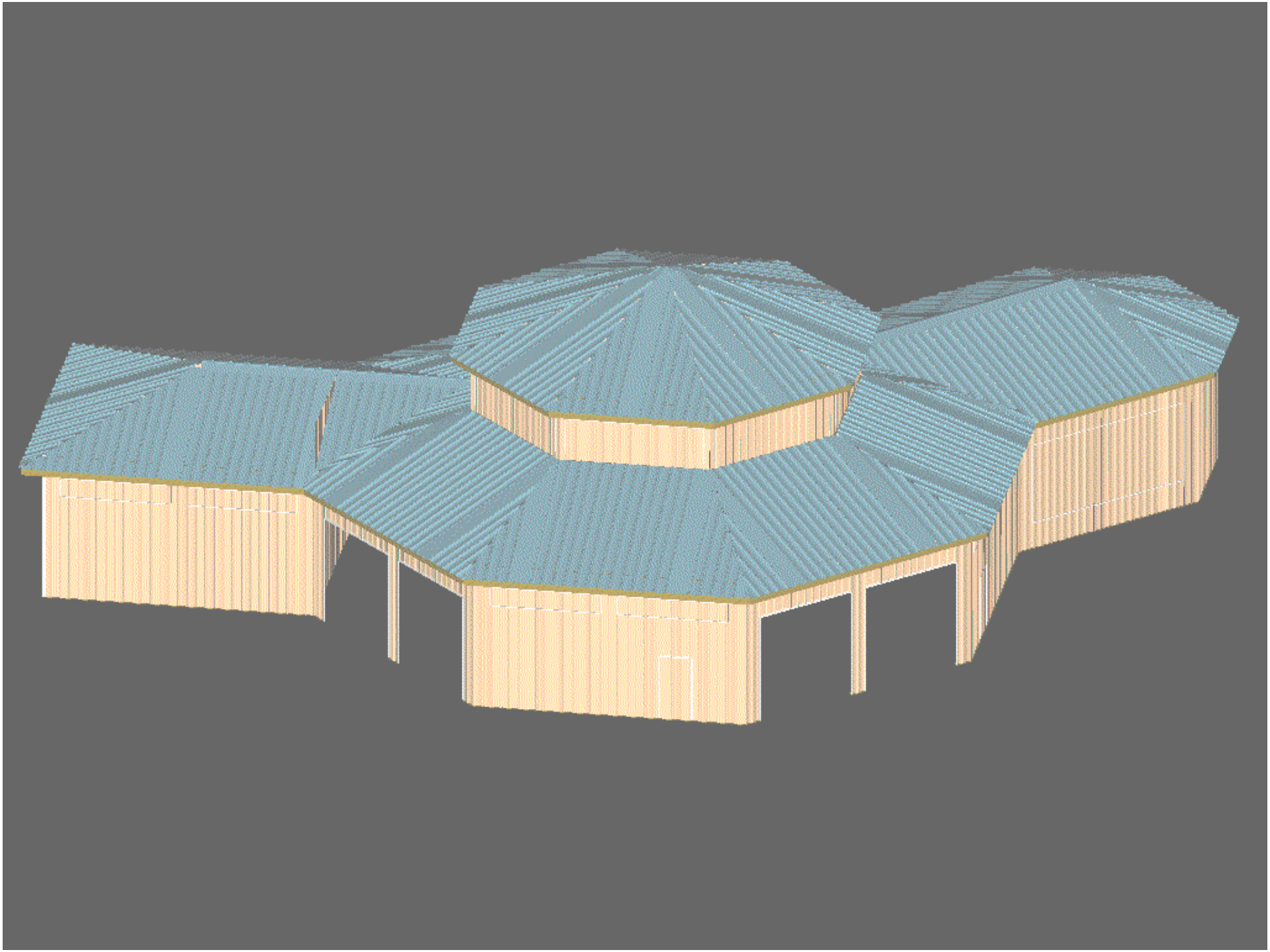
8 - Member Shape Combinations

4 - Member Orientations (Asymmetric Shapes)

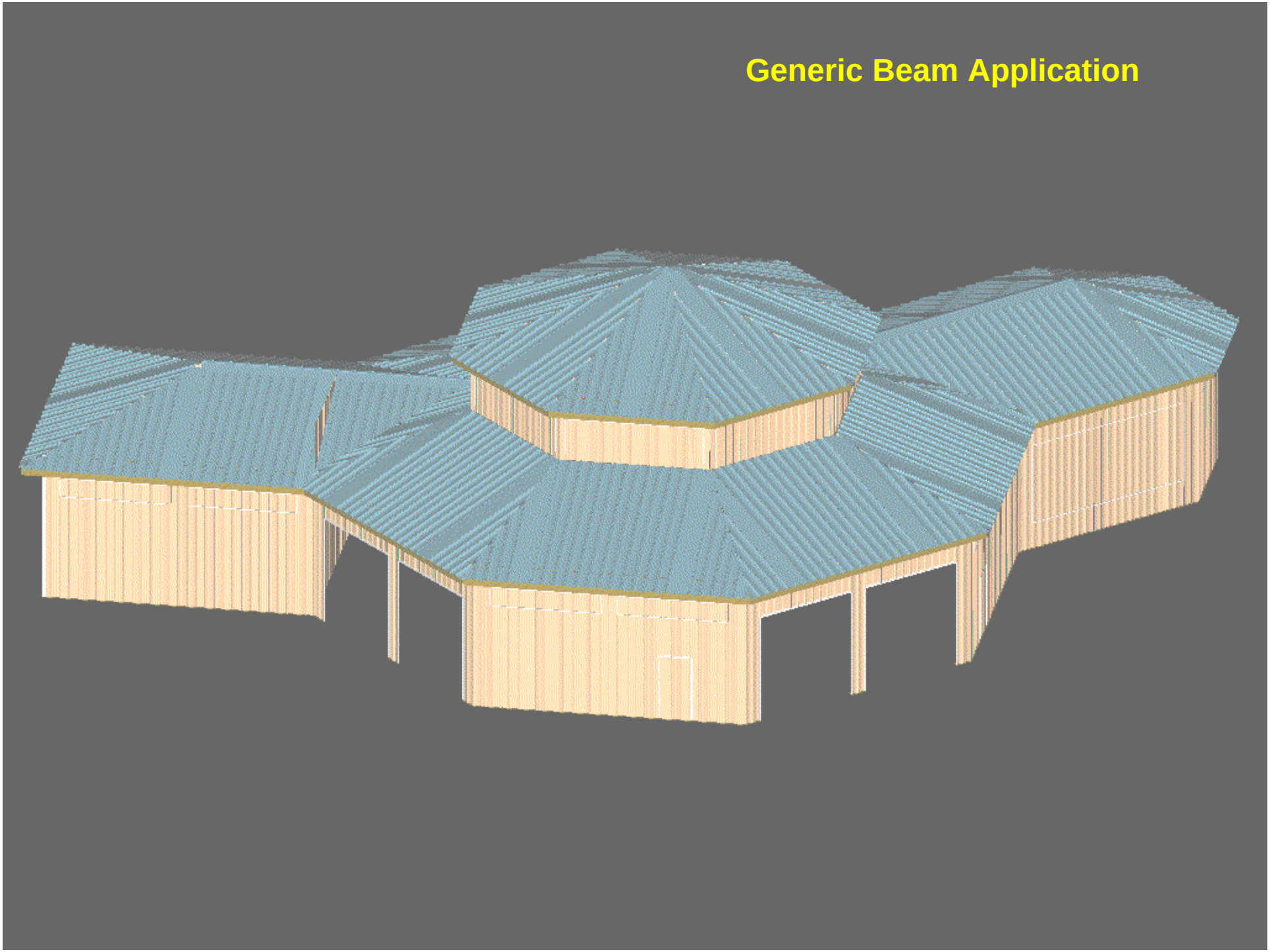
5 - Primary Framing Options

8 - Secondary Framing Options

We wrote about 300 small, specific, object based connections



Generic Beam Application



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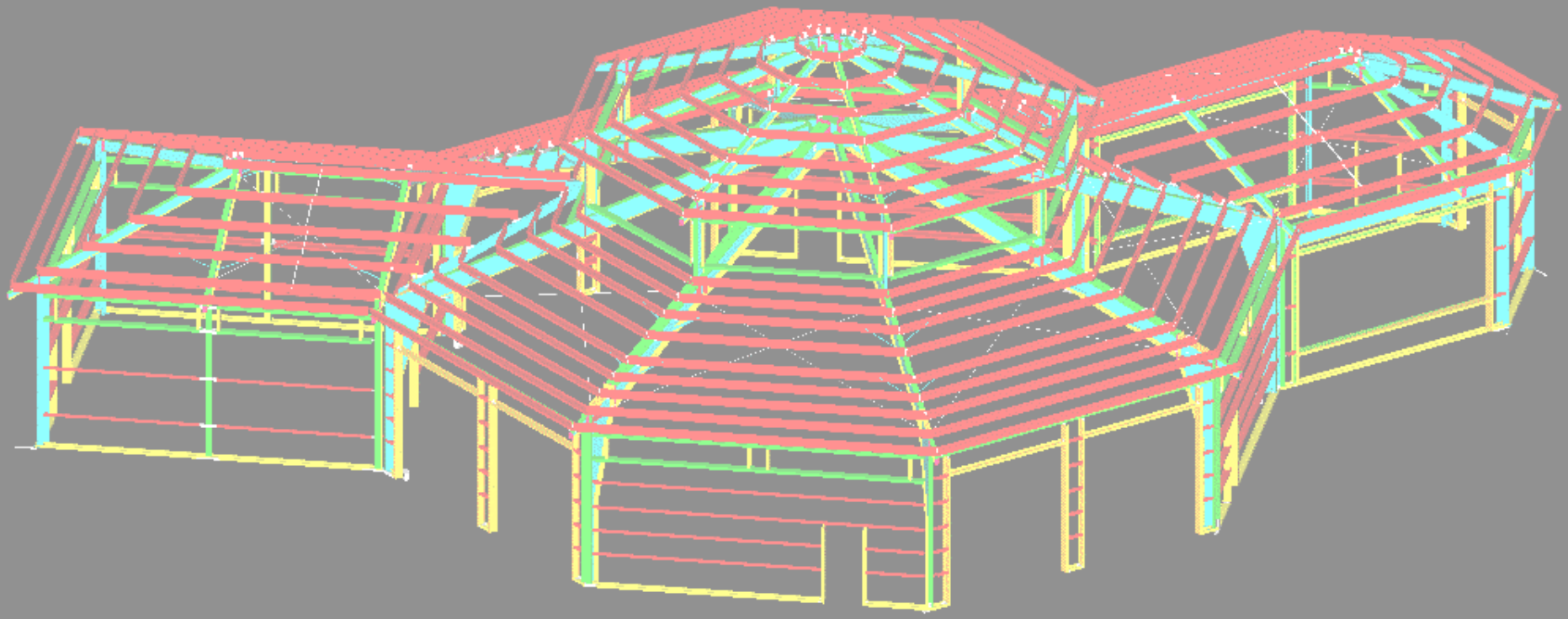
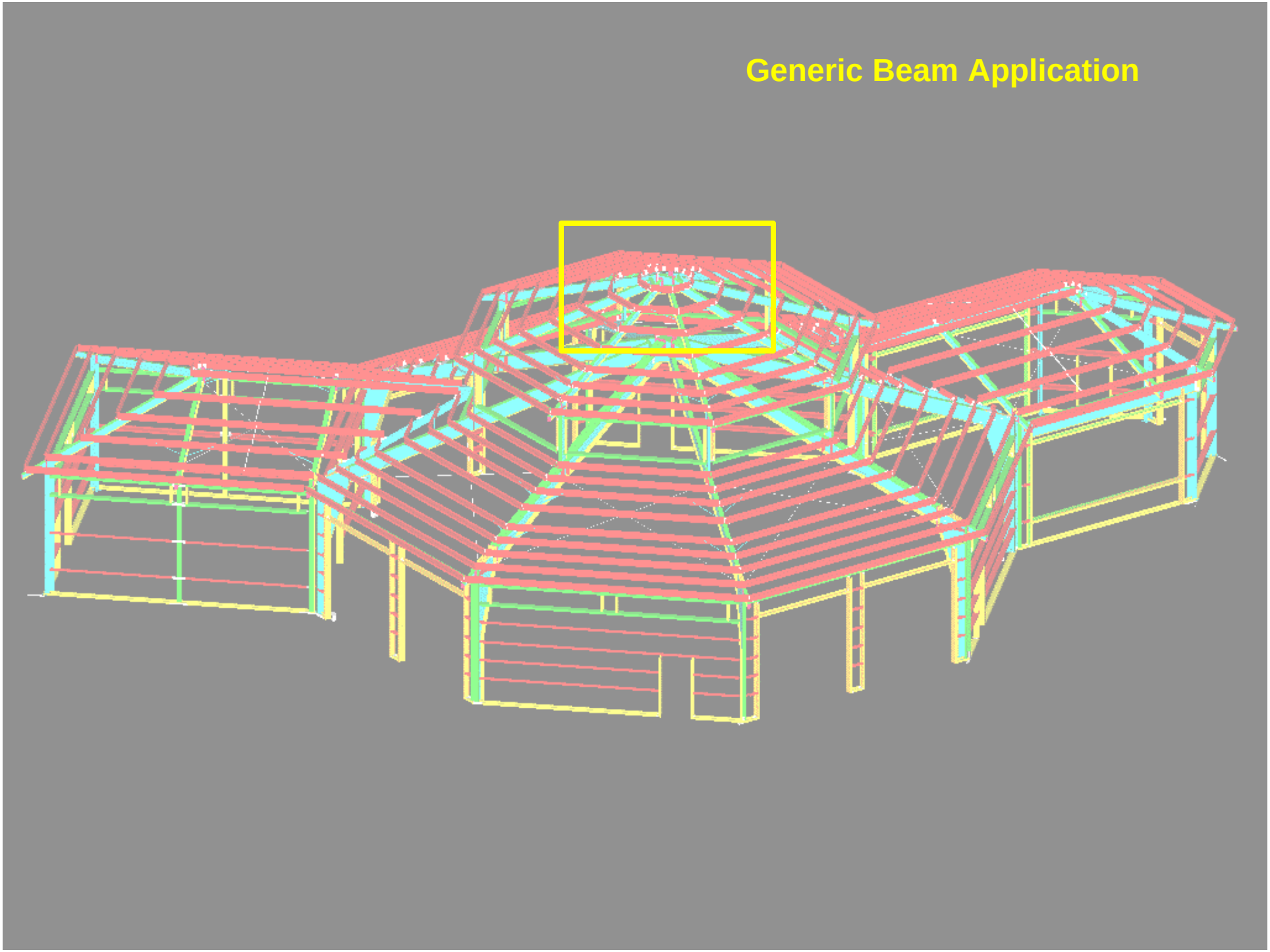


Generic Beam Application



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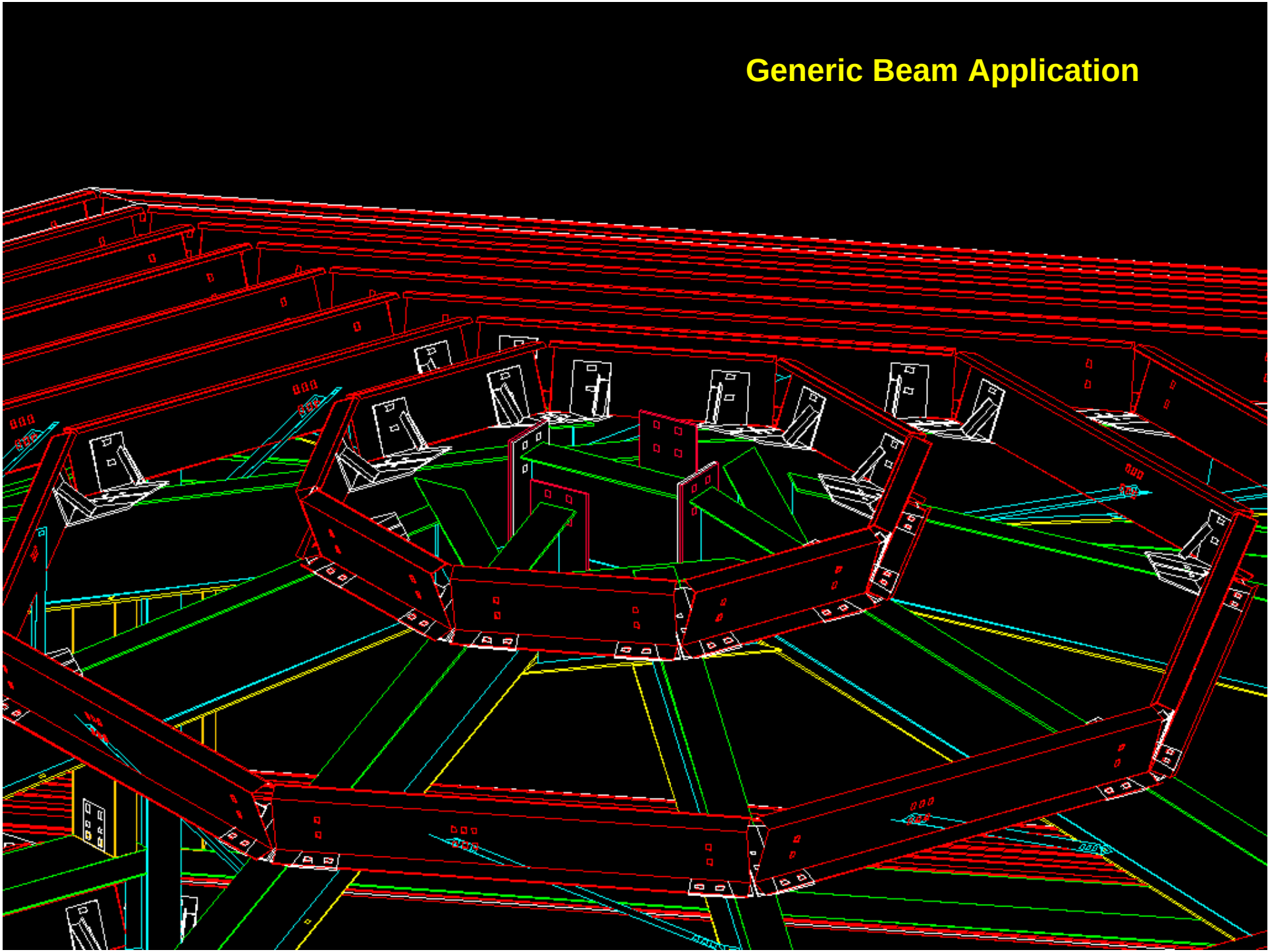
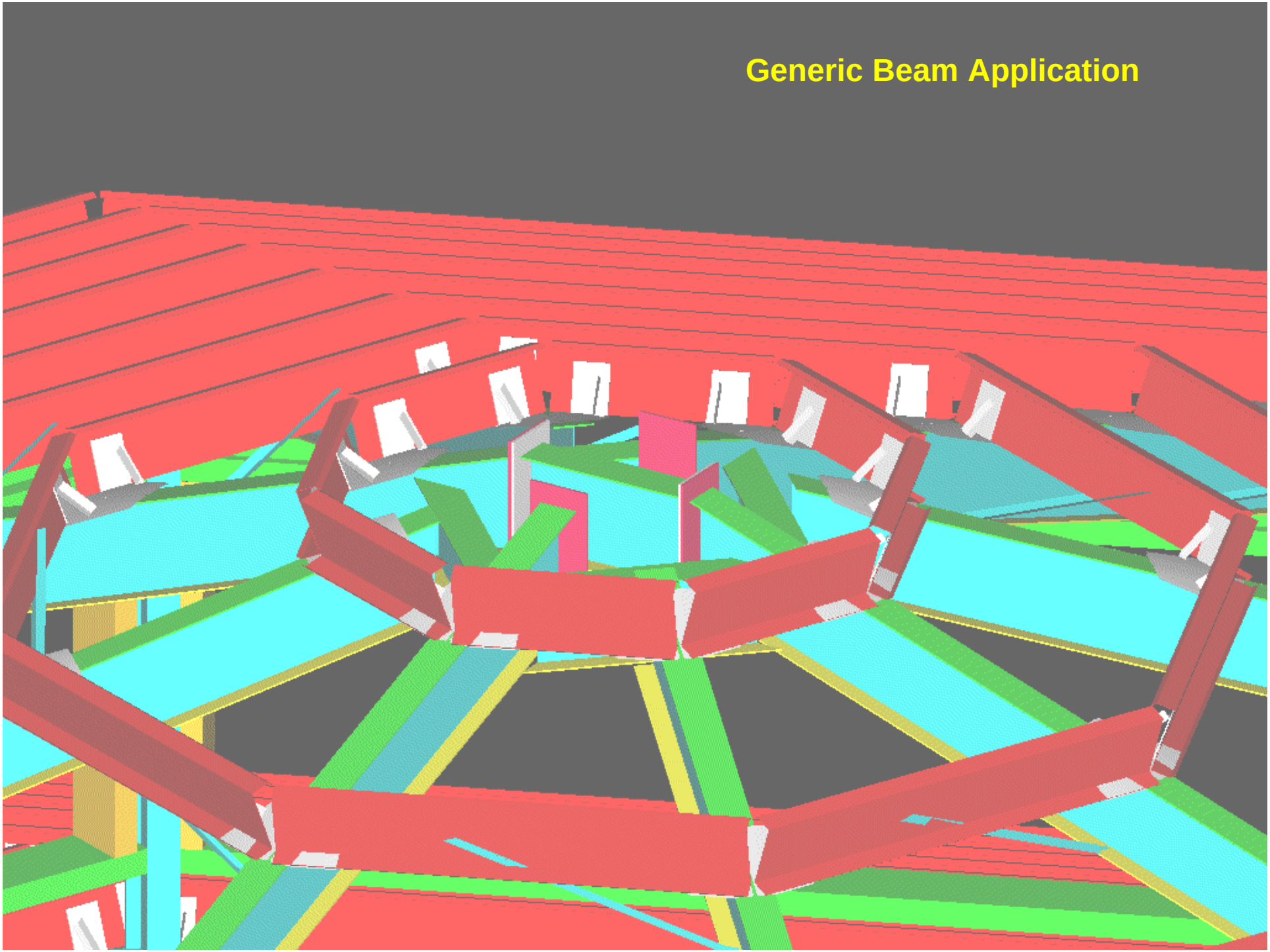
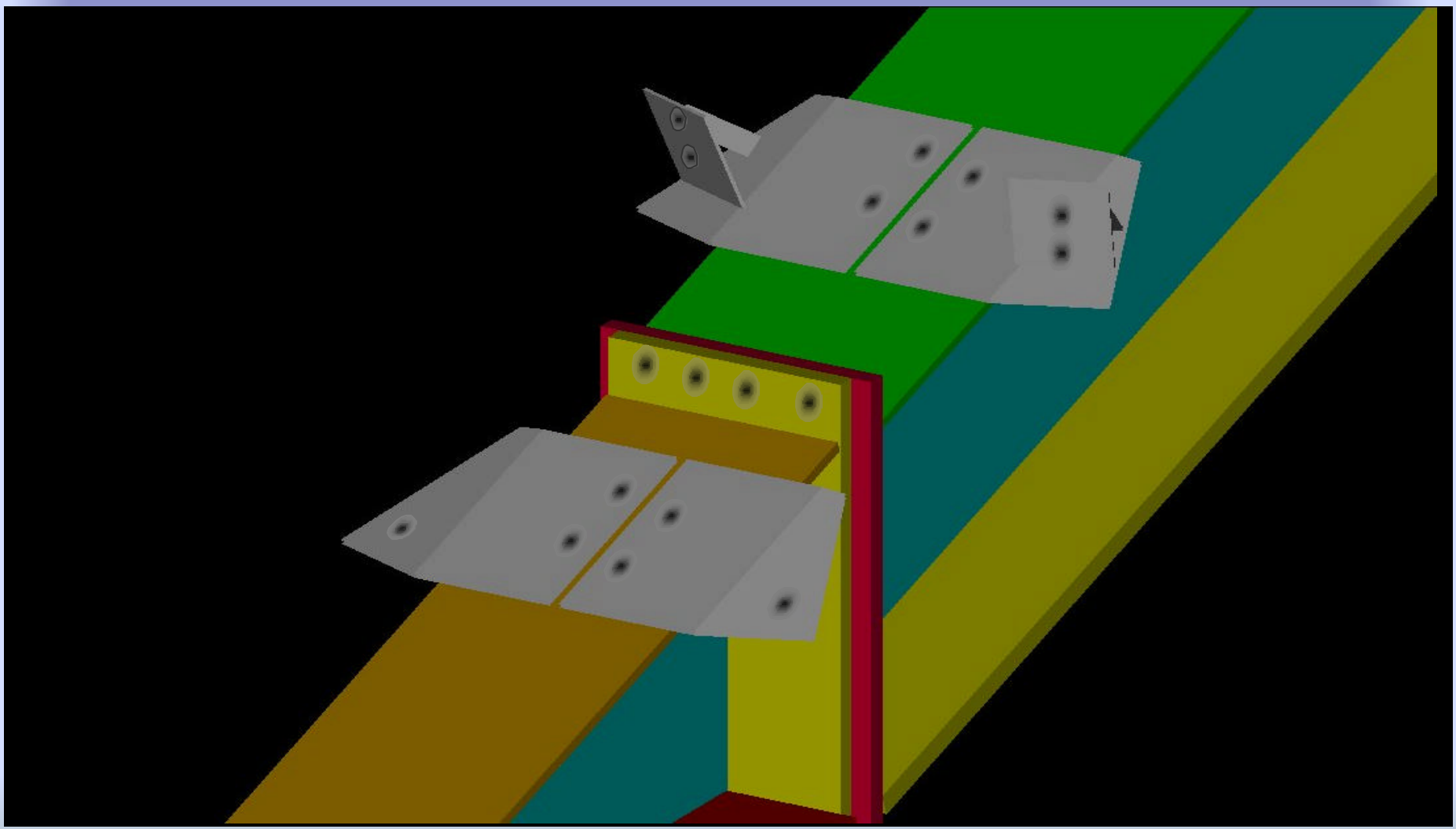



Generic Beam Application

Beyond CAD

Direct download to Manufacturing Equipment



Beyond CAD

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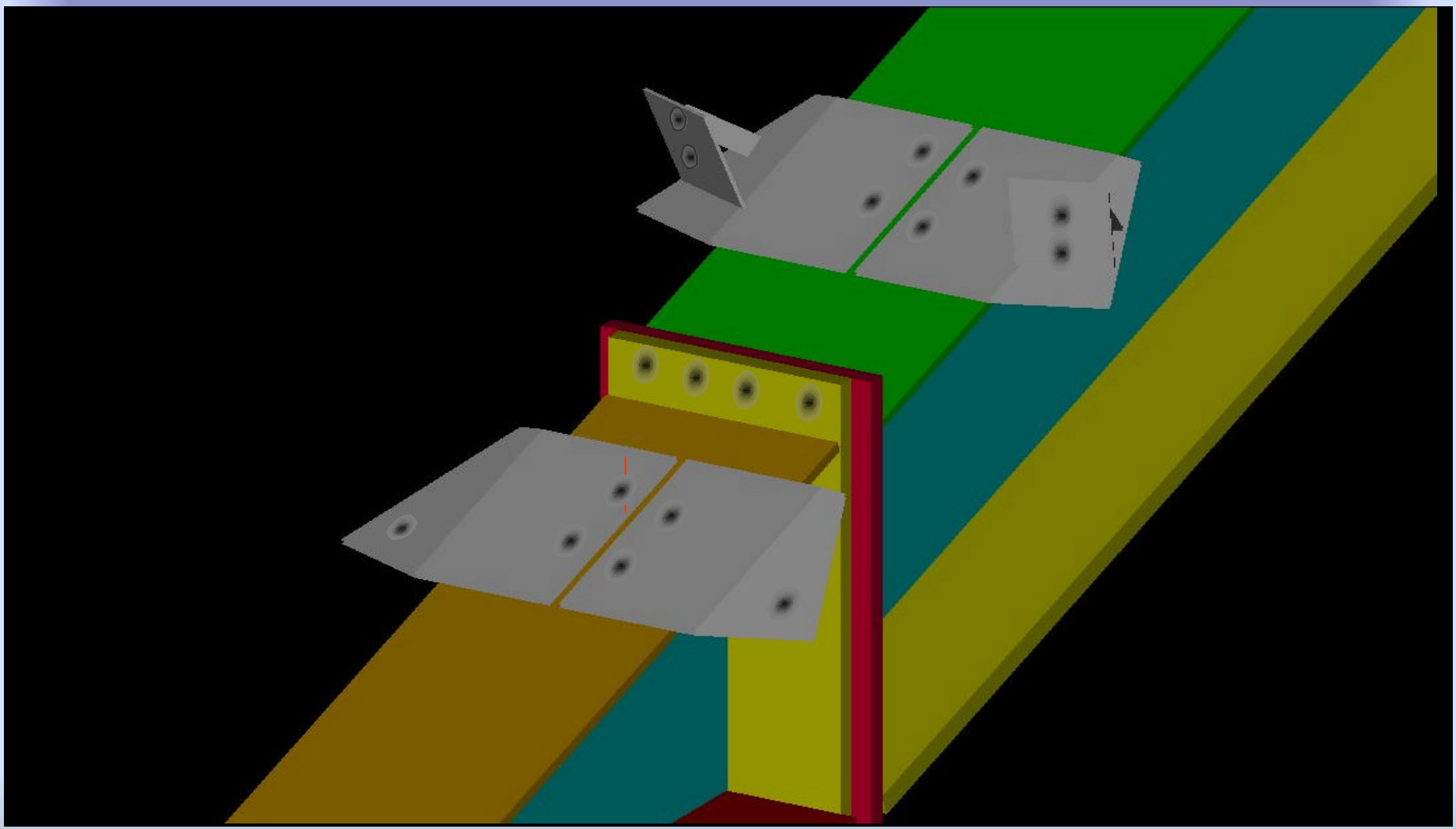
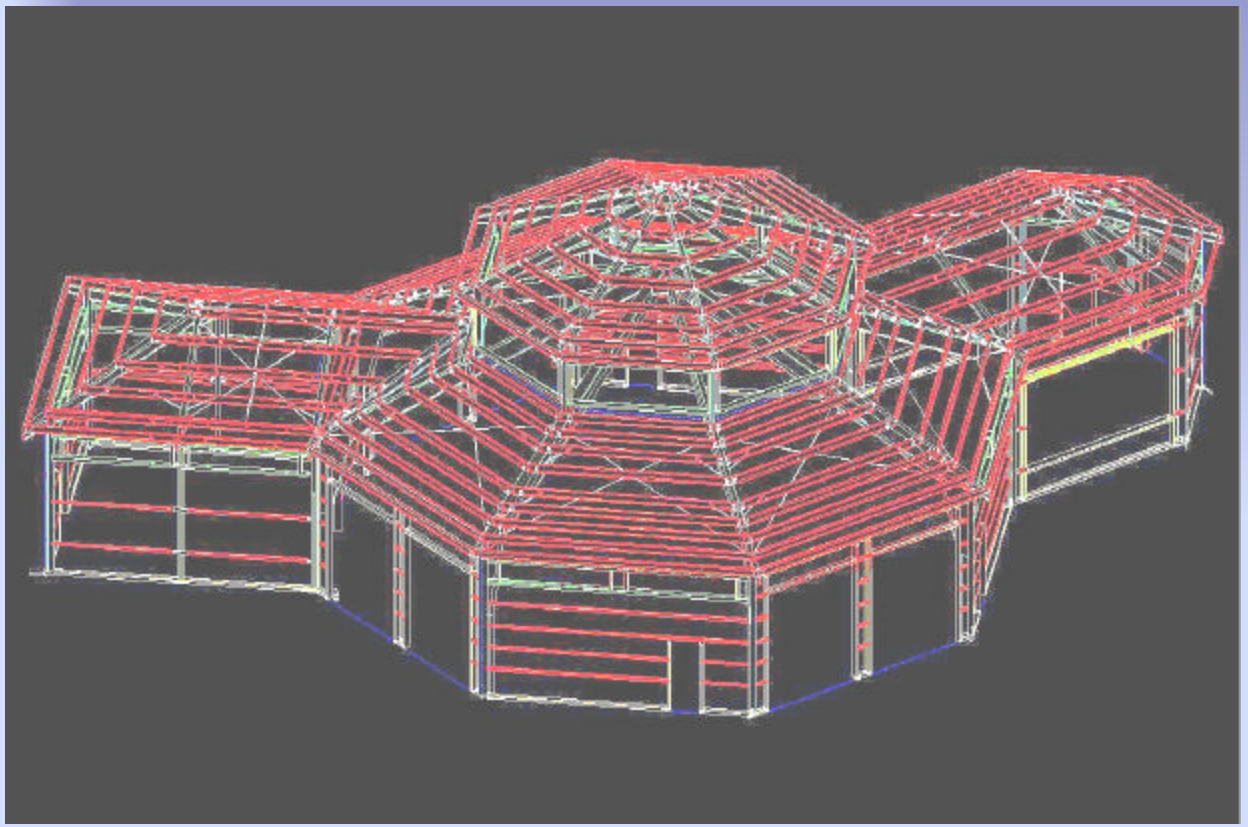


Computer Automated Design

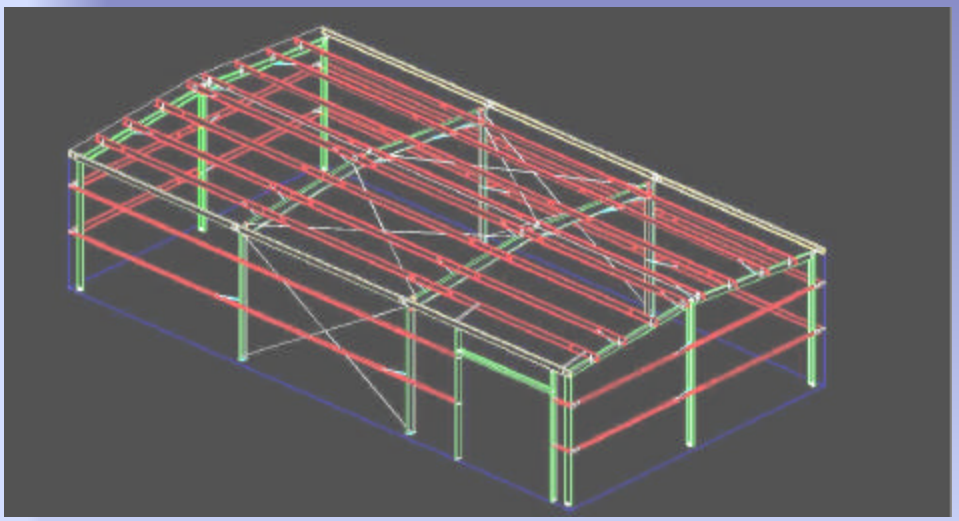
3D Visualization



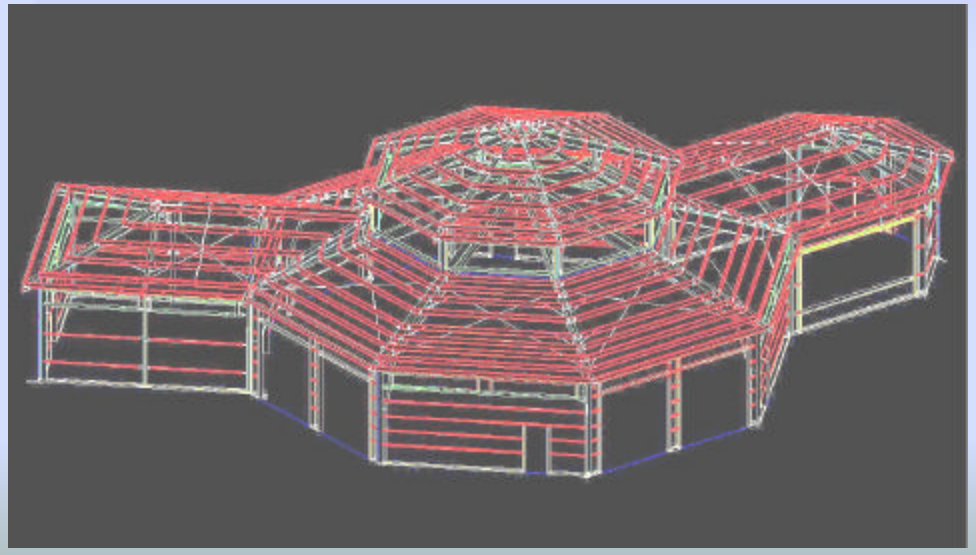
Best Tool for:

- Visualizing
- Communicating
- Checking
- Collaborating

Computer Automated Design

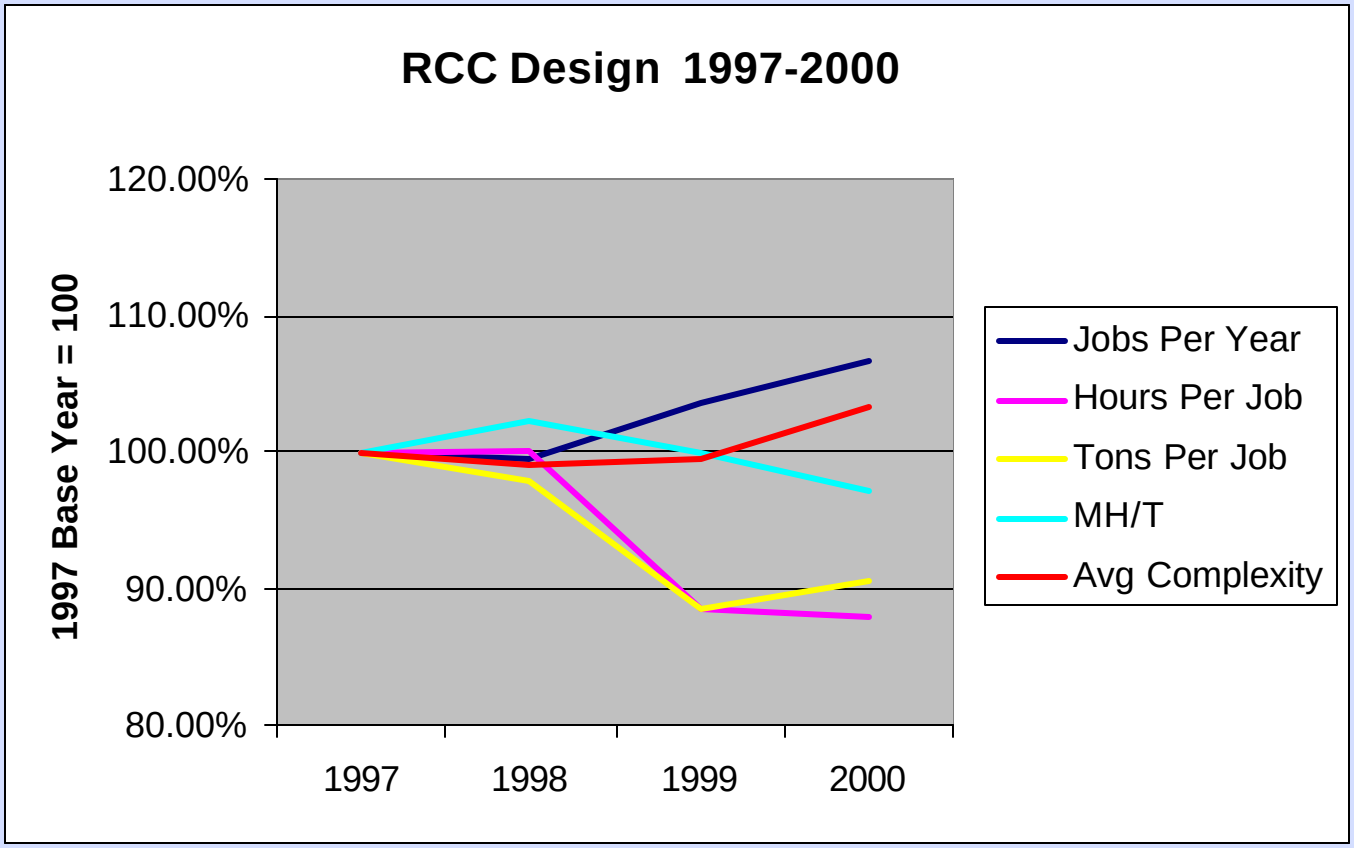


Complexity (1-10)	2	
Total number of parts	300	
Unique parts	30	
	Old Way	New Way
Drafting Time	2 days	1 day



Complexity (1-10)	10	
Total number of parts	13,000	
Unique parts	450	
	Old Way	New Way
Drafting Time	45 days	15 days

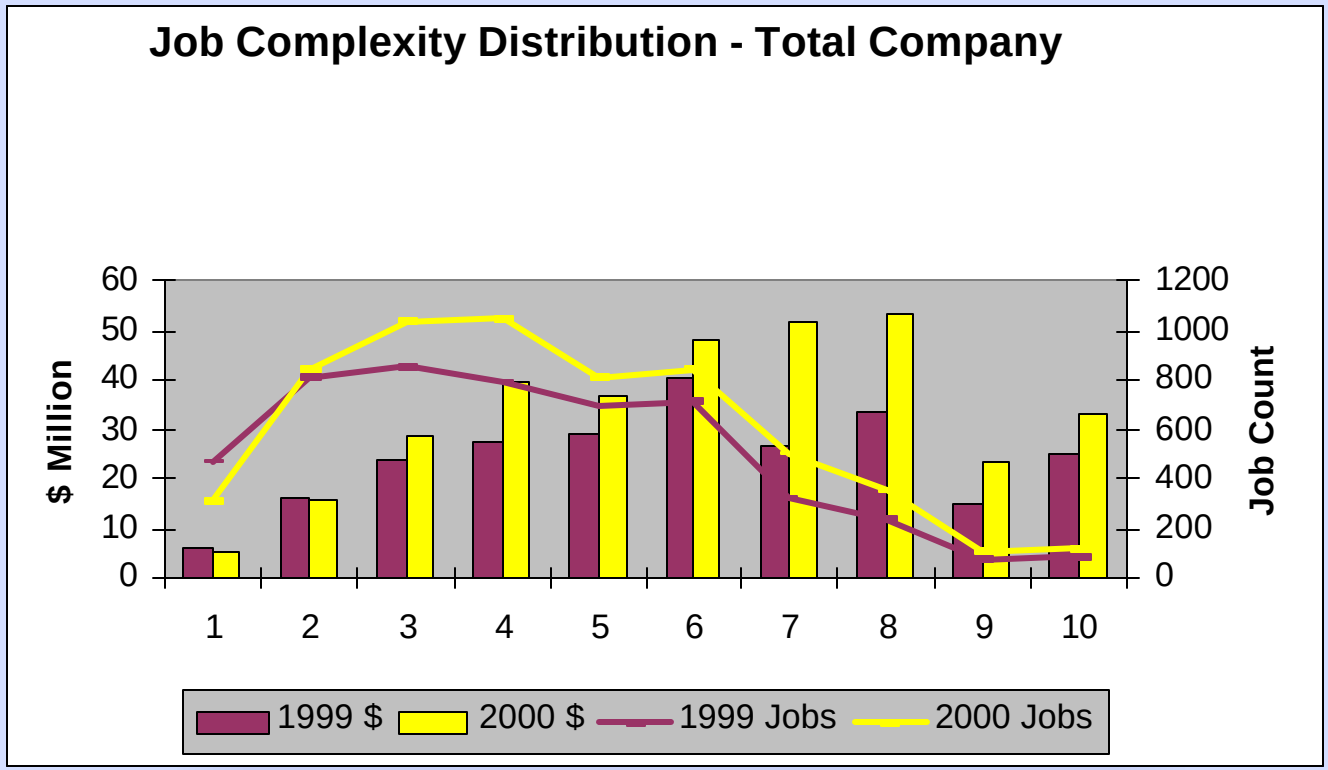
Our results....



Training time cut 20%

Back-charges cut by 60%

Our results....



COMPLEX JOBS 6 - 10

Job count up 33% year-to-year

Revenue up 50% year-to-year