

More Dynamo For Structure

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About the speaker

Marcello Sgambelluri

Marcello is internationally recognized as one of the top BIM leaders and contributors to the education and implementation of BIM technology in the building industry. Marcello continually speaks at Autodesk University since 2012. Marcello has received the 1st place speaker award 5 times out of the last 6 years between 2012 thru 2017. Marcello received his Bachelors and Master's degrees in Civil Engineering and he is also a licensed Civil and Structural Engineer. Marcello has also started a media empire that includes:

Simply Complex Blog Site -

<http://therevitcomplex.blogspot.com/>

Simply Complex YouTube

<https://www.youtube.com/channel/UC7IkO1Bc4PhFKAHEArmQ0jw/videos>

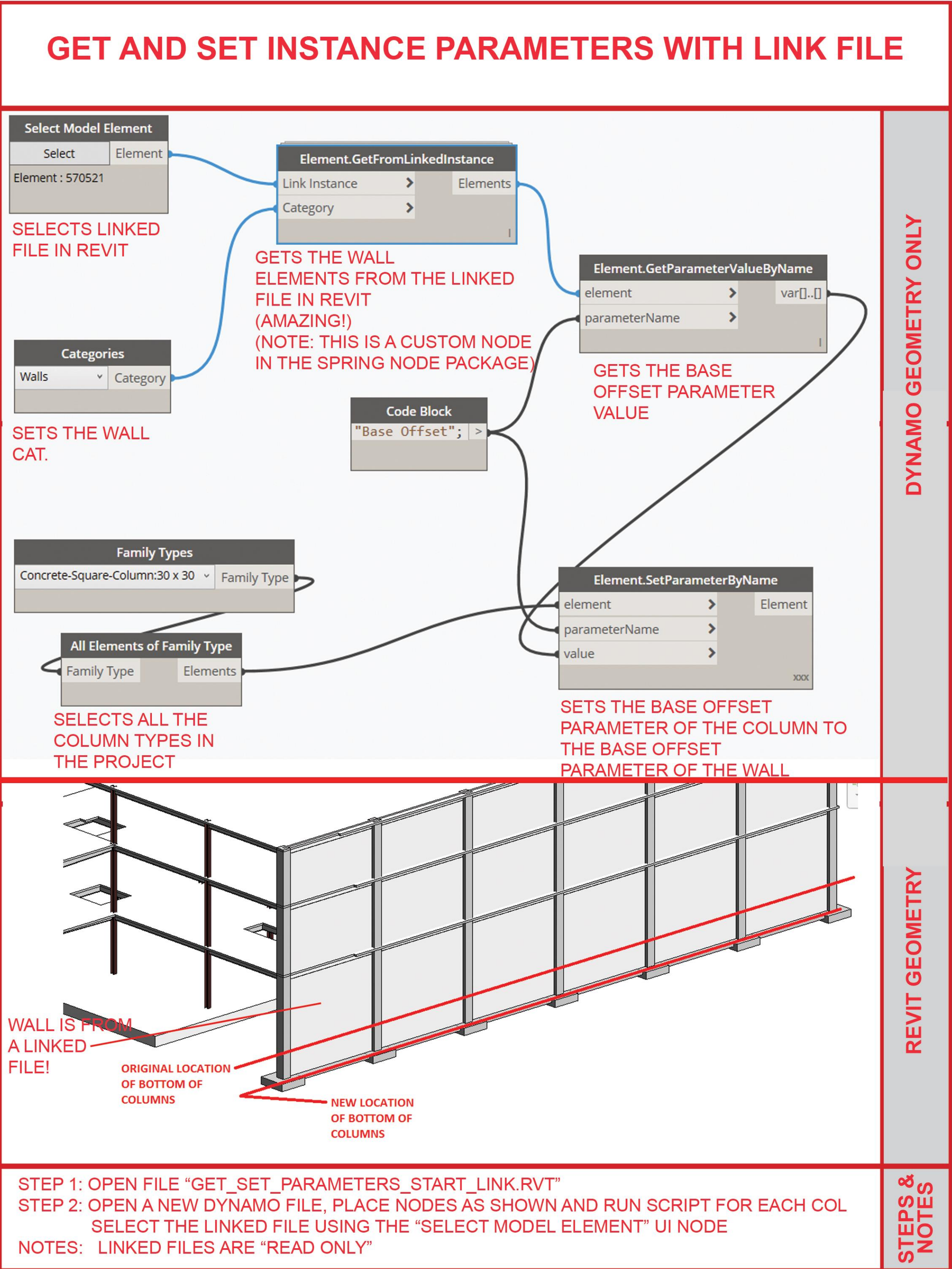
Simply Complex Podcast -

<http://simplycomplex.sharedcoordinates.com/>

AEC Complex Comic -

<https://www.aeccomplexcomic.com/>

Dynamo Cheat sheet Anatomy



WALL IS FROM A LINKED FILE!

ORIGINAL LOCATION OF BOTTOM OF COLUMNS

NEW LOCATION OF BOTTOM OF COLUMNS

STEP 1: OPEN FILE "GET_SET_PARAMETERS_START_LINK.RVT"

STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT FOR EACH COL

SELECT THE LINKED FILE USING THE "SELECT MODEL ELEMENT" UI NODE

NOTES: LINKED FILES ARE "READ ONLY"

DYNAMO GEOMETRY ONLY

REVIT GEOMETRY

STEPS & NOTES

Title Zone
Dynamo Node Zone
Revit Geometry Zone
Notes and Steps Zone

Exercises

FLAT FRAMING TO CURVED (PROJECTION)

DYNAMO NODES

DYNAMO GEOMETRY

REVT GEOMETRY

STEPS & NOTES

STEP 1: OPEN FILE "FLAT_FRAMING.RVT"
STEP 2: OPEN A NEW DYNAMO FILE. PLACE NODES AS SHOWN AND RUN SCRIPT
NOTE: ALT METHOD: CONSIDER USING THE "SET LOCATION" NODE INSTEAD OF PROJECTION

REVT WALL BY COMPLEX FACE

DYNAMO NODES

DYNAMO GEOMETRY

REVT GEOMETRY

STEPS

1. OPEN REVIT FILE "REVIT_WALL_BY_FACE_COMPLEX_START.RVT"
2. OPEN A NEW DYNAMO FILE. ADD THE NODES AS SHOWN. SELECT THE COW MASS FACES
3. RUN GRAPH. ADD DOORS AND WINDOWS AS DESIRED.

GET AND SET INSTANCE PARAMETERS WITH LINK FILE

DYNAMO GEOMETRY ONLY

REVT GEOMETRY

STEPS & NOTES

STEP 1: OPEN FILE "GET_SET_PARAMETERS_START_LINK.RVT"
STEP 2: OPEN A NEW DYNAMO FILE. PLACE NODES AS SHOWN AND RUN SCRIPT FOR EACH COL
SELECT THE LINKED FILE USING THE "SELECT MODEL ELEMENT" UI NODE
NOTES: LINKED FILES ARE "READ ONLY"

CANOPY BEAM FRAMING ON GRIDS (USING PROJECTION)

DYNAMO NODES

DYNAMO AND REVIT GEOMETRY

STEPS & NOTES

STEP 1: OPEN FILE "CANOPY_BEAM.RVT"
STEP 2: OPEN A NEW DYNAMO FILE. PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: IF THE STRUCTRAL FRAMING NODE FAILS TO CREATE STRUCTURAL FRAMING THEN SIMPLIFY THE INPUT CURVE OR CHECK IF THE BEAM IS CURVING IN 2 DIRECTIONS

CHANGE BEAM TYPES USING ENGINEERING LOGIC

DYNAMO NODES

REVT GEOMETRY

STEPS & NOTES

STEP 1: OPEN "CHANGE_BM_TYPE_LOGIC_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE AND ADD NODES AND RUN
NOTES: THE "FAMILY AND TYPE" PARAMETER IS USED TO CHANGE THE FAMILY TYPE
ALSO CONSIDER USING YOUR OWN ENGINEERING RULES OF THUMB

GET ETABS ANALYSIS FRAME RESULTS

DYNAMO NODES

ETABS RESULTS

STEPS & NOTES

STEPS: 1. OPEN ETABS "ETABS_GEOMETRY_ANALYTICS_FINAL.EDB". AND RUN ANALYSIS
2. AND OPEN DYNAMO AND ADD THE NODES ABOVE
NOTES: 1. RESULTS SHOW LOAD CASE OR LOAD COMBO ALSO NOTE UNITS ARE IN LB-IN
2. IF THE NODE DOES NOT UPDATE PLACE A NEW NODE ON CANVAS

COLUMN CENTERLINE

DYNAMO NODES

DYNAMO GEOMETRY

REVT GEOMETRY

STEPS & NOTES

STEP 1: OPEN FILE "COL_CENTERLINE_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE. PLACE NODES AS SHOWN AND RUN SCRIPT
NOTE: THE METHOD SHOWN ONLY WORKS ON COLUMNS THAT HAVE A CONSTANT PROFILE AND IS STRAIGHT. ALSO NOTE THAT THE COL CENTERLINE IS THE GEOMETRY C.G.

GET ETABS GEOMETRY TO GAME ENGINE

DYNAMO NODES

GAME ENGINE GEOMETRY

ETABS GEOMETRY

STEPS & NOTES

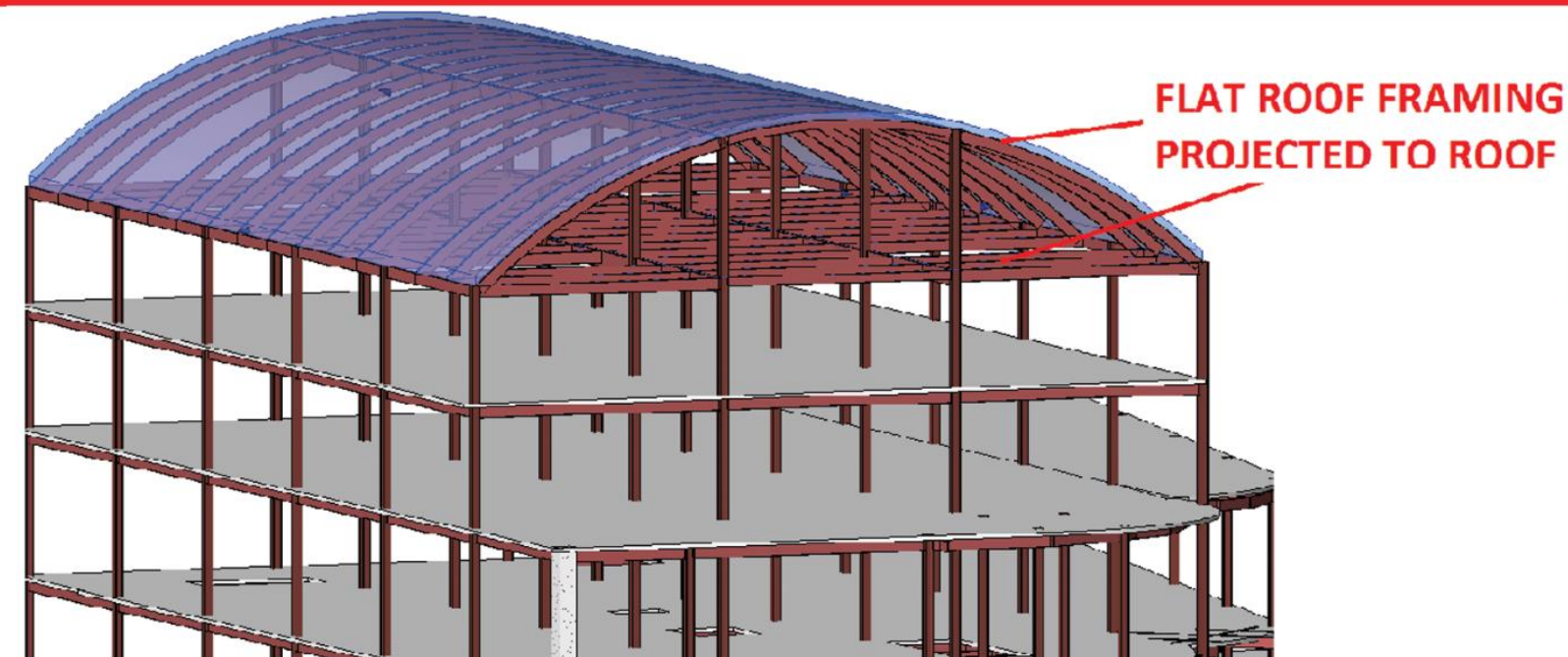
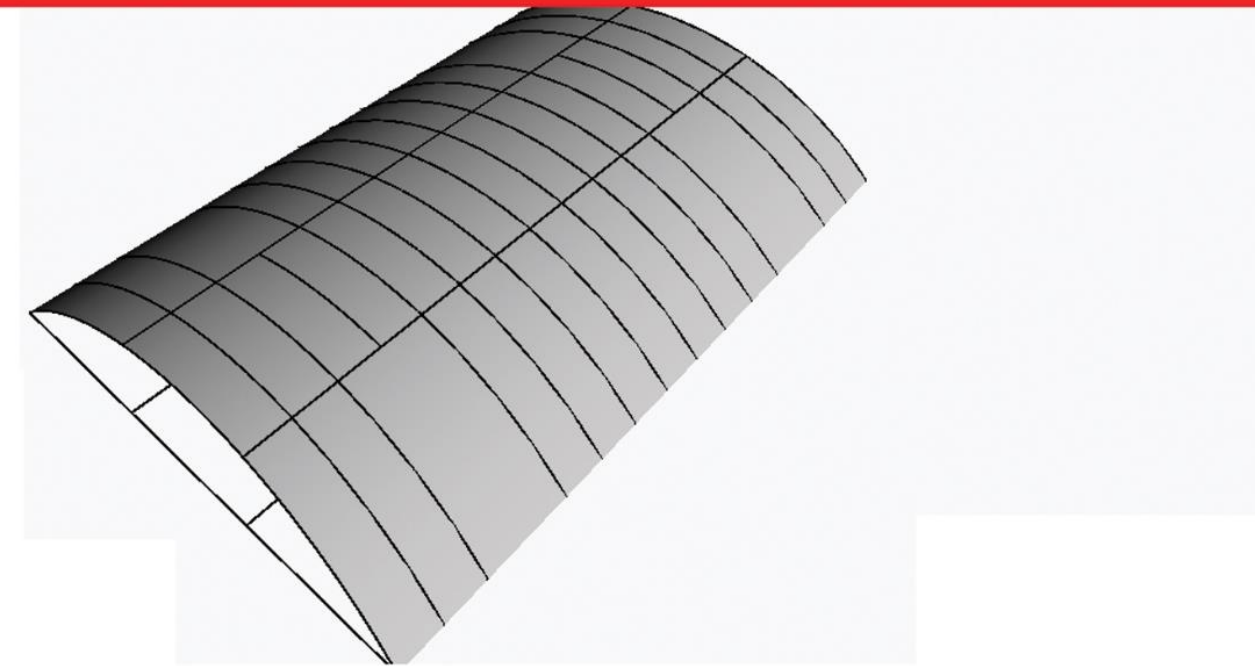
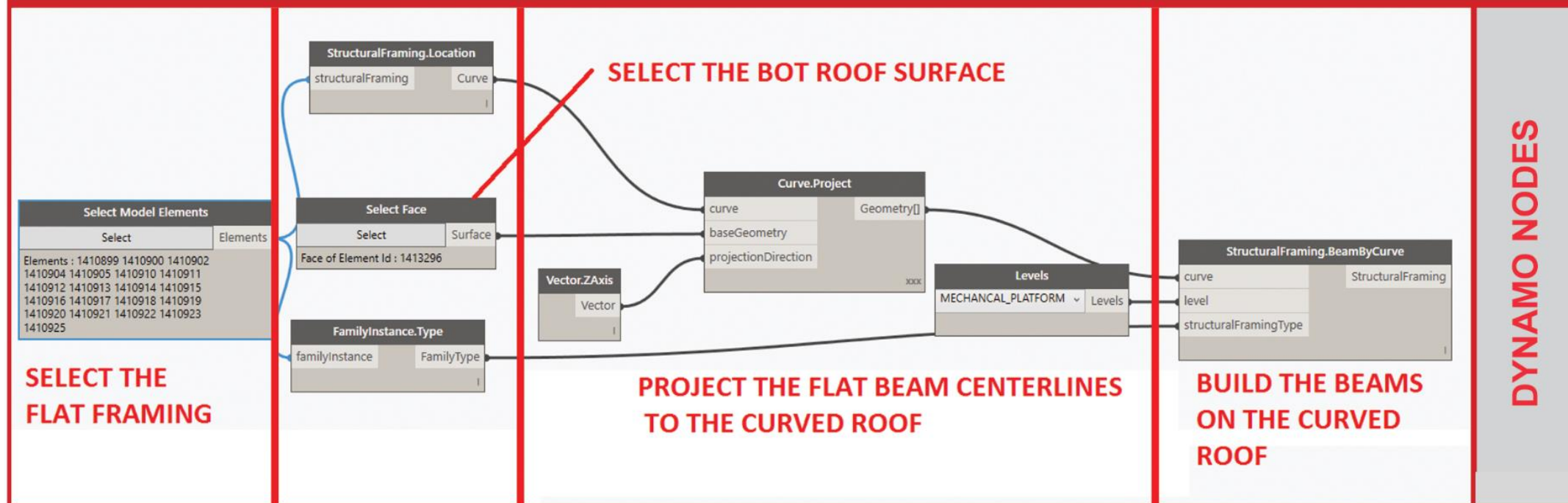
STEPS: 1. OPEN ANY ETABS MODEL "ETABS MODEL VIEWER.EDB" OPEN DYNAMO
2. OPEN ADD THE NODES ABOVE
NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL-
2. ONLY FRAMES ELEMENTS ARE SHOWN IN GAME ENGINE

100+ Additional Exercises in Handout



Exercise 1

FLAT FRAMING TO CURVED (PROJECTION)



STEP 1: OPEN FILE "FLAT_FRAMING.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTE: ALT METHOD: CONSIDER USING THE "SET LOCATION" NODE" INSTEAD OF PROJECTION

DYNAMO NODES

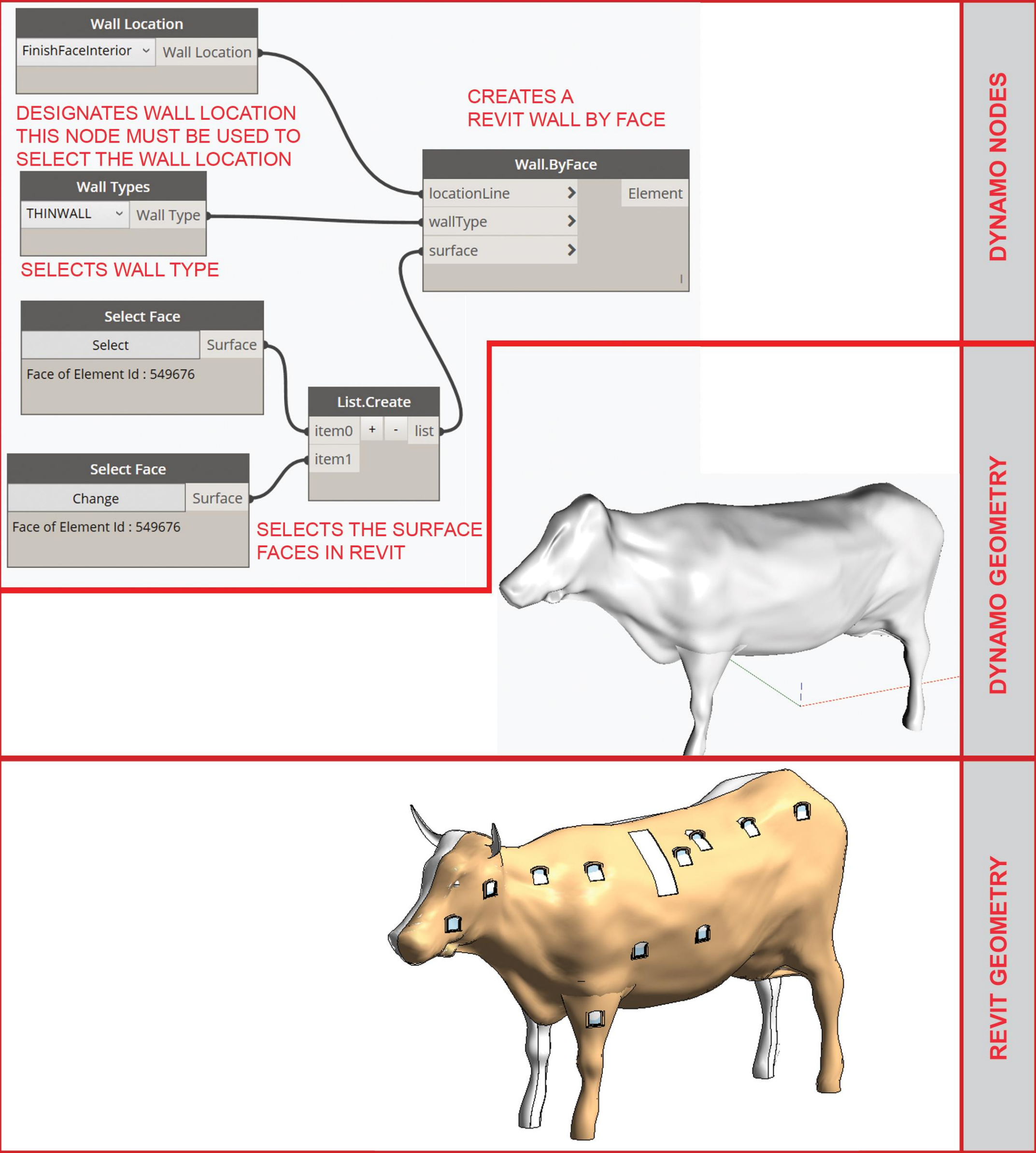
DYNAMO GEOMETRY

REVIT GEOMETRY

STEPS & NOTES

Exercise 2

REVIT WALL BY COMPLEX FACE



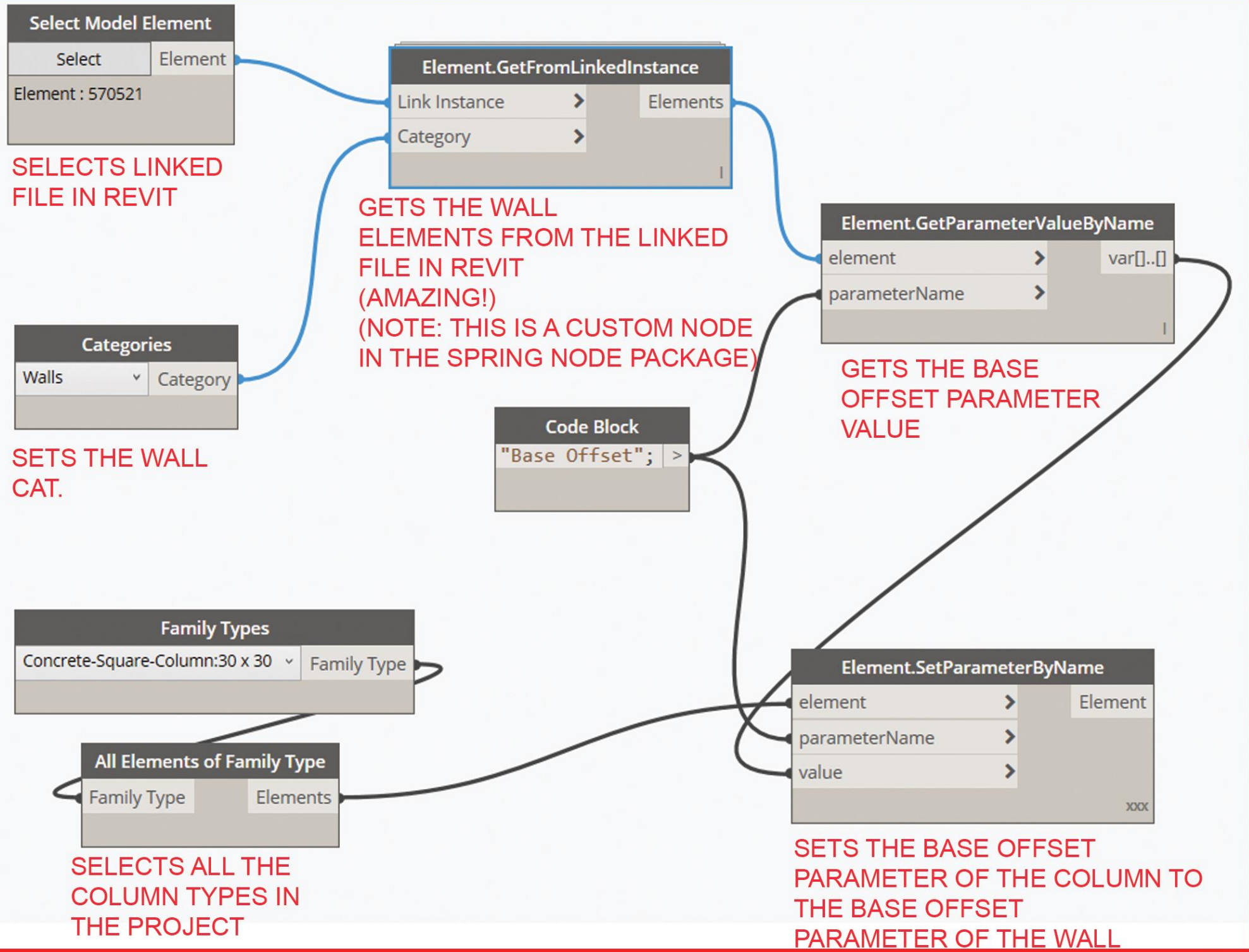
- STEPS
1. OPEN REVIT FILE “REVIT_WALL_BY_FACE_COMPLEX_START.RVT”

2. OPEN A NEW DYNAMO FILE. ADD THE NODES AS SHOWN. SELECT THE COW MASS FACES

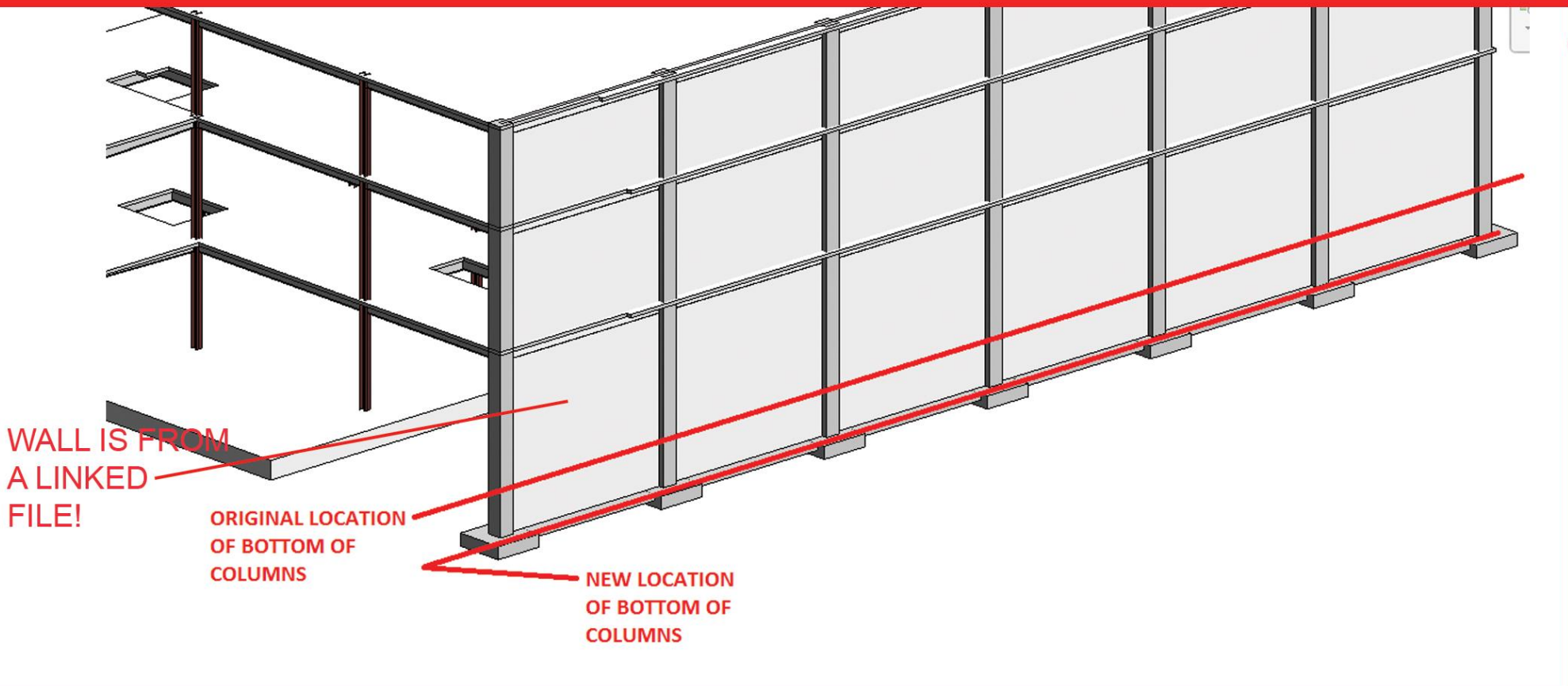
3. RUN GRAPH. ADD DOORS AND WINDOWS AS DESIRED.
- STEPS

Exercise 3

GET AND SET INSTANCE PARAMETERS WITH LINK FILE



DYNAMO GEOMETRY ONLY

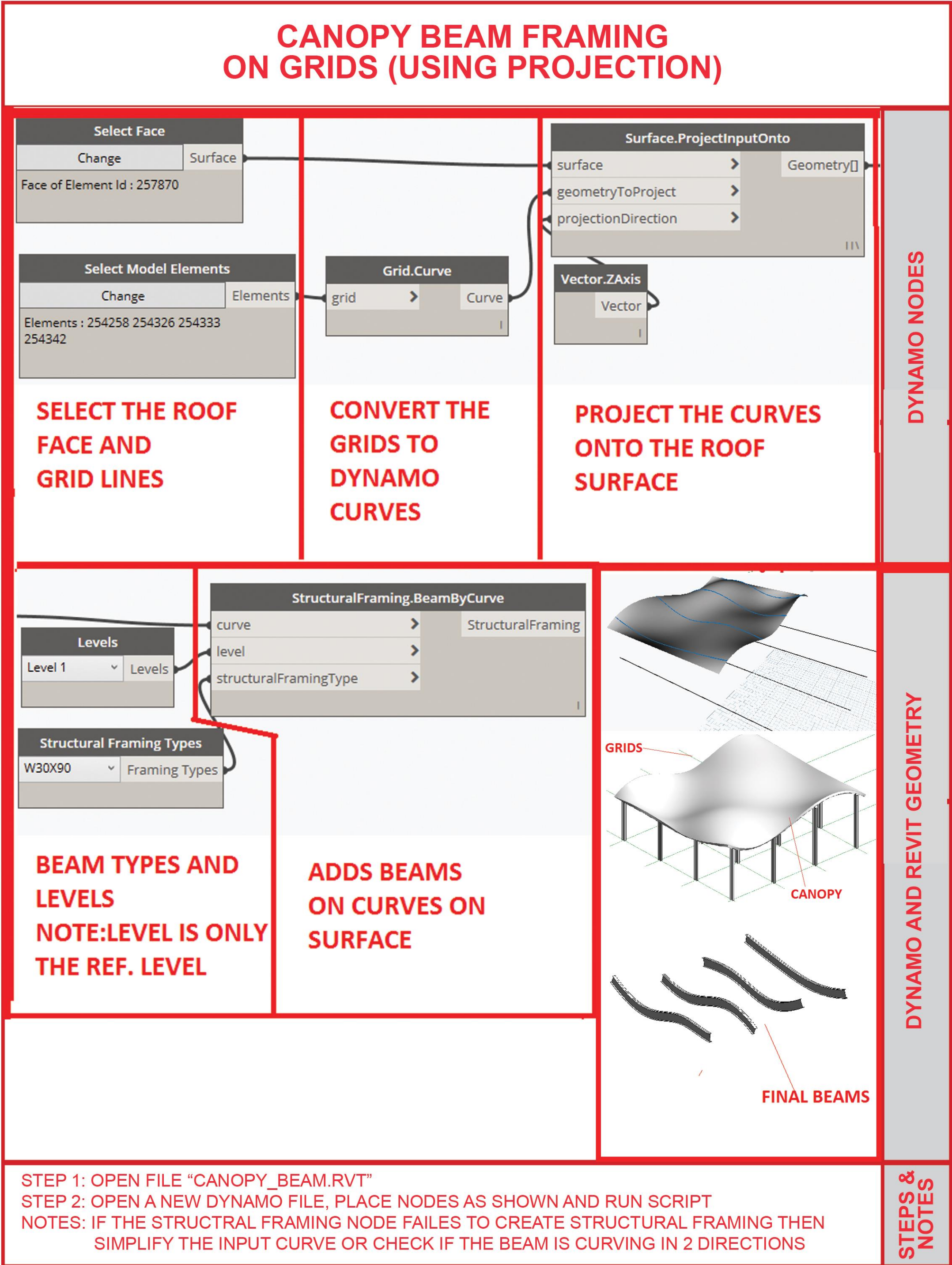


REVIT GEOMETRY

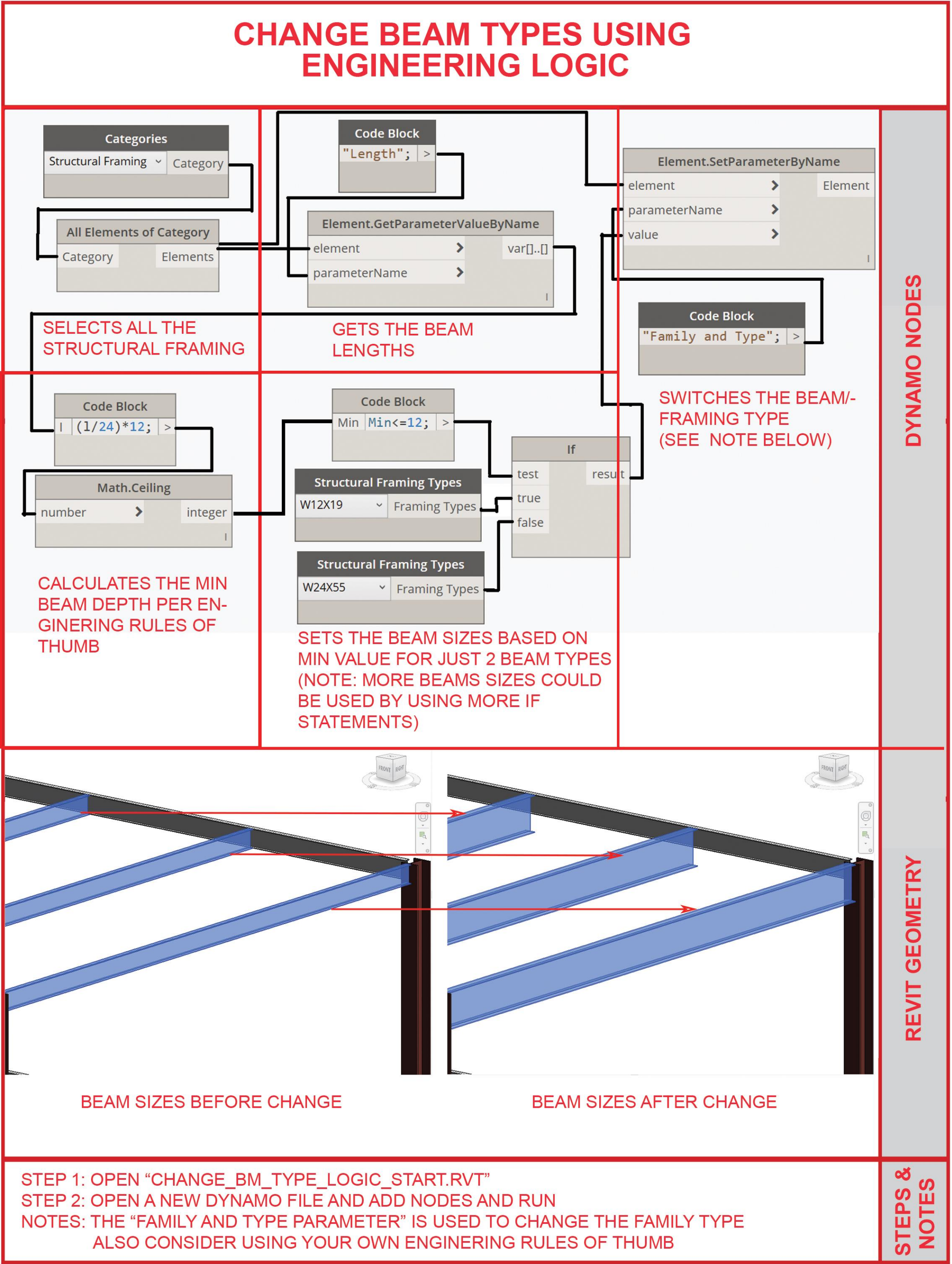
STEP 1: OPEN FILE "GET_SET_PARAMETERS_START_LINK.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT FOR EACH COL
SELECT THE LINKED FILE USING THE "SELECT MODEL ELEMENT" UI NODE
NOTES: LINKED FILES ARE "READ ONLY"

STEPS & NOTES

Exercise 4



Exercise 5



Code Block

(1/24)*12;

>

Math.Ceiling

number

integer

CALCULATES THE MIN BEAM DEPTH PER ENGINEERING RULES OF THUMB

Code Block

Min

Min<=12;

>

Structural Framing Types

W12X19

Framing Types

Structural Framing Types

W24X55

Framing Types

If

test

true

false

result

SETS THE BEAM SIZES BASED ON MIN VALUE FOR JUST 2 BEAM TYPES (NOTE: MORE BEAMS SIZES COULD BE USED BY USING MORE IF STATEMENTS)

BEAM SIZES BEFORE CHANGE

BEAM SIZES AFTER CHANGE

REVIT GEOMETRY

STEP 1: OPEN "CHANGE_BM_TYPE_LOGIC_START.RVT"

STEP 2: OPEN A NEW DYNAMO FILE AND ADD NODES AND RUN

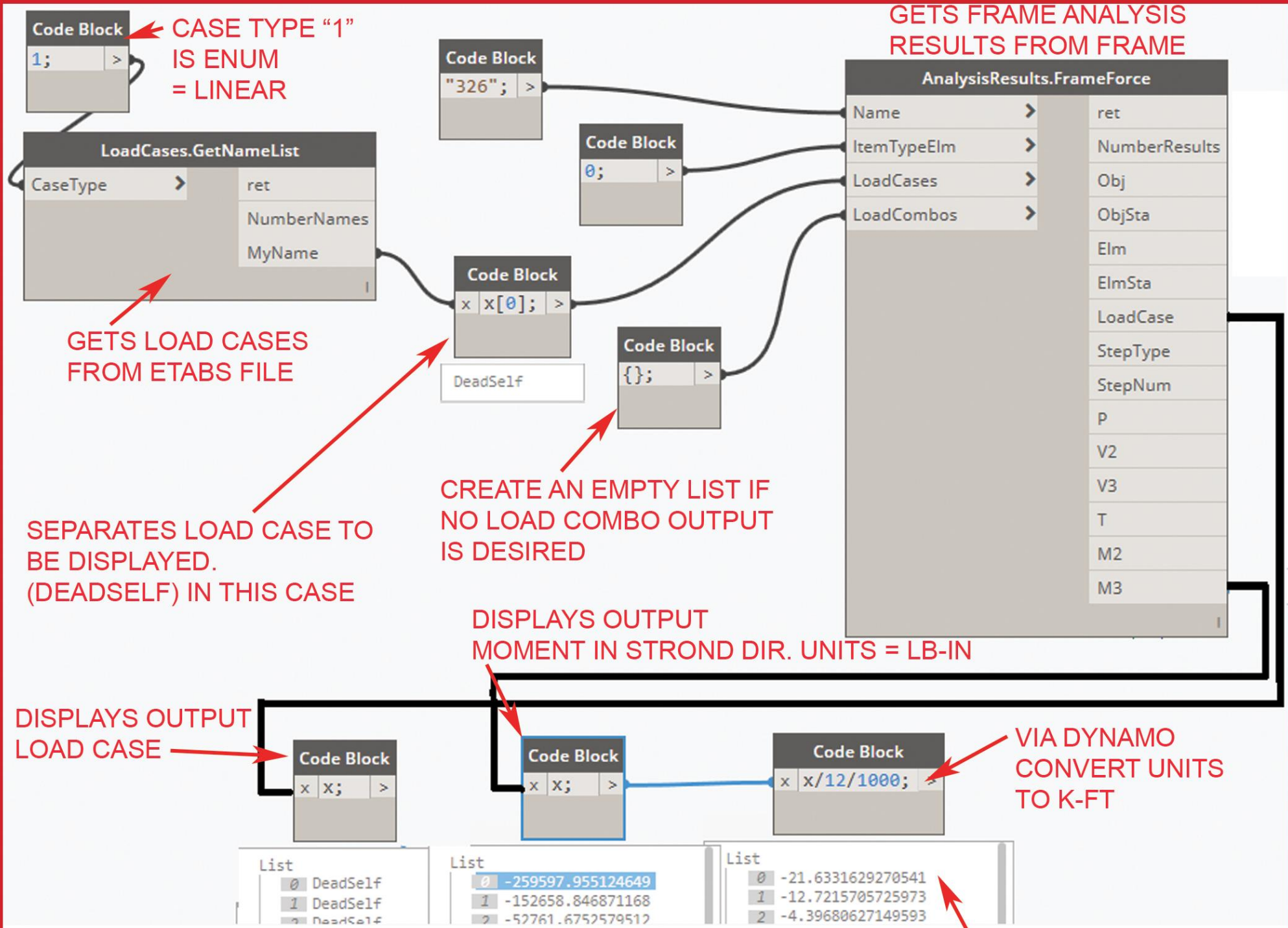
NOTES: THE "FAMILY AND TYPE PARAMETER" IS USED TO CHANGE THE FAMILY TYPE

ALSO CONSIDER USING YOUR OWN ENGINEERING RULES OF THUMB

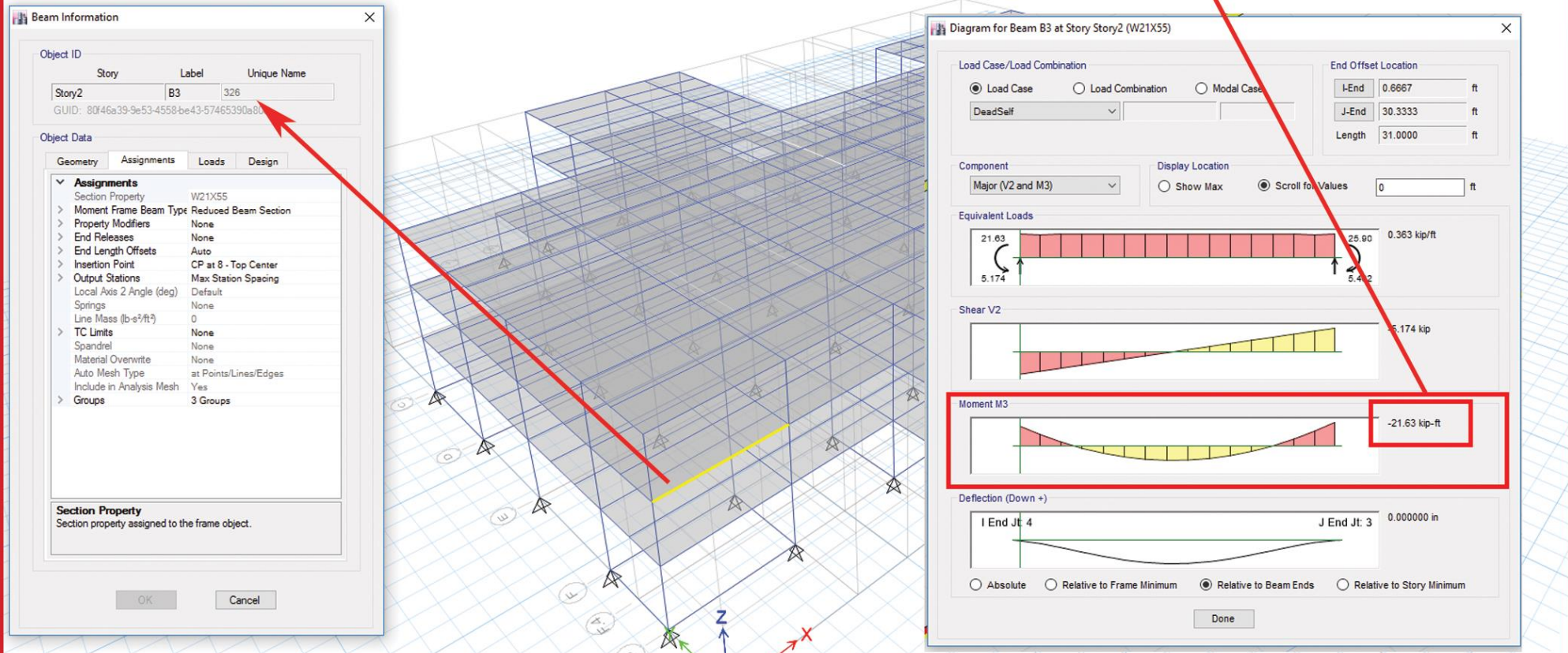
STEPS & NOTES

Exercise 6

GET ETABS ANALYSIS FRAME RESULTS



DYNAMO NODES

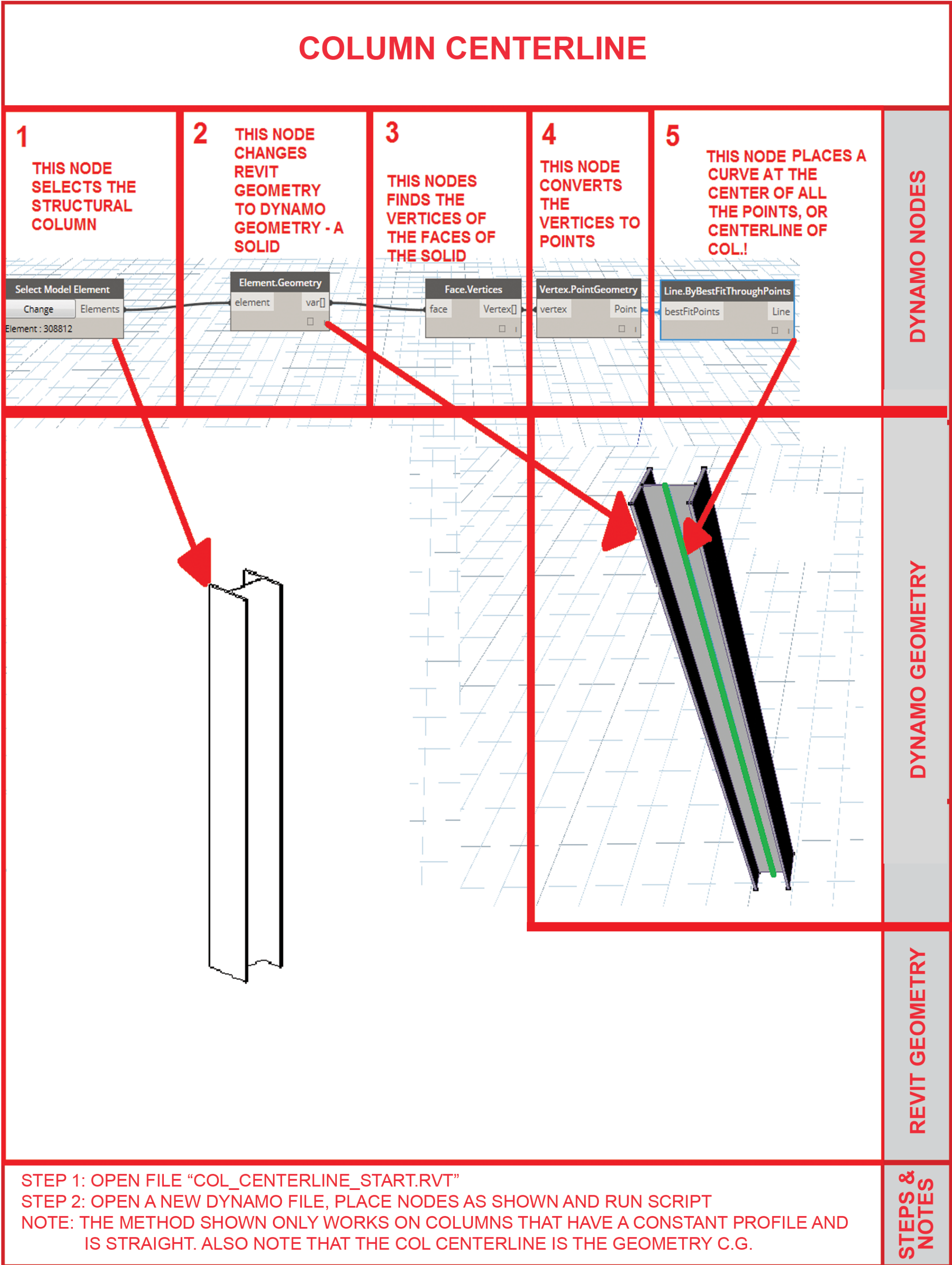


ETABS RESULTS

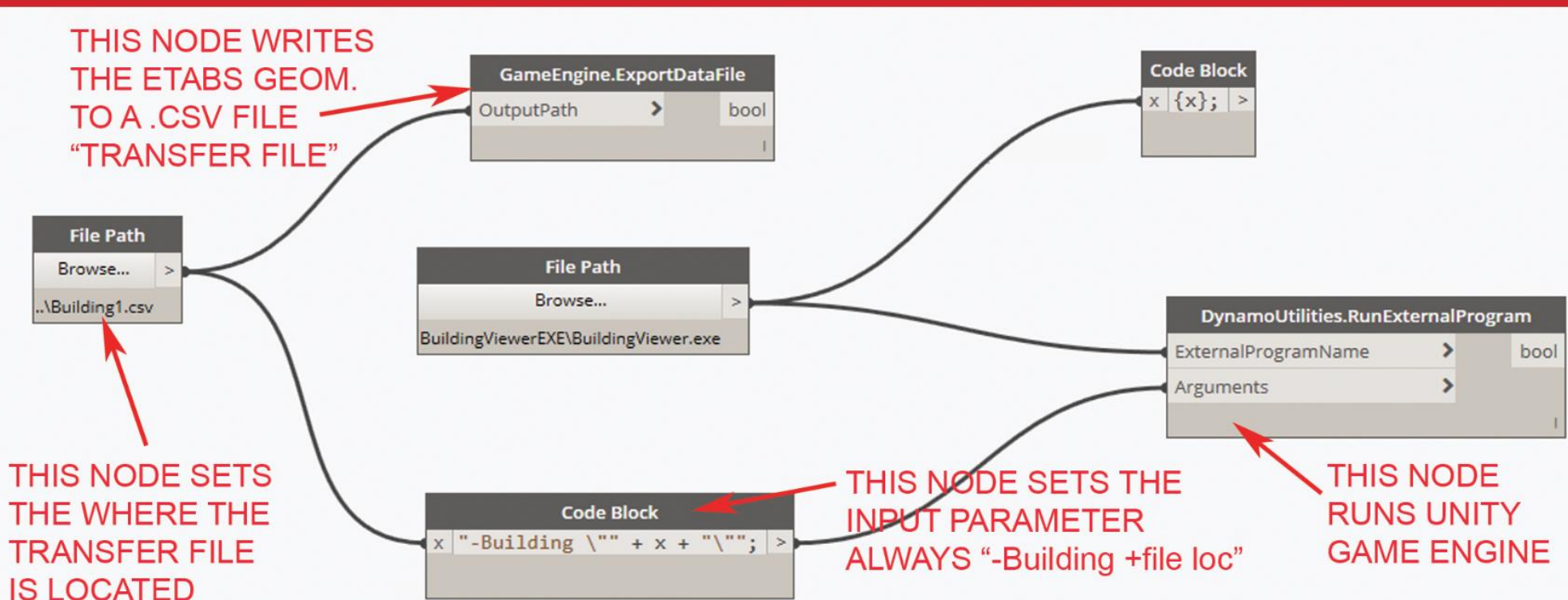
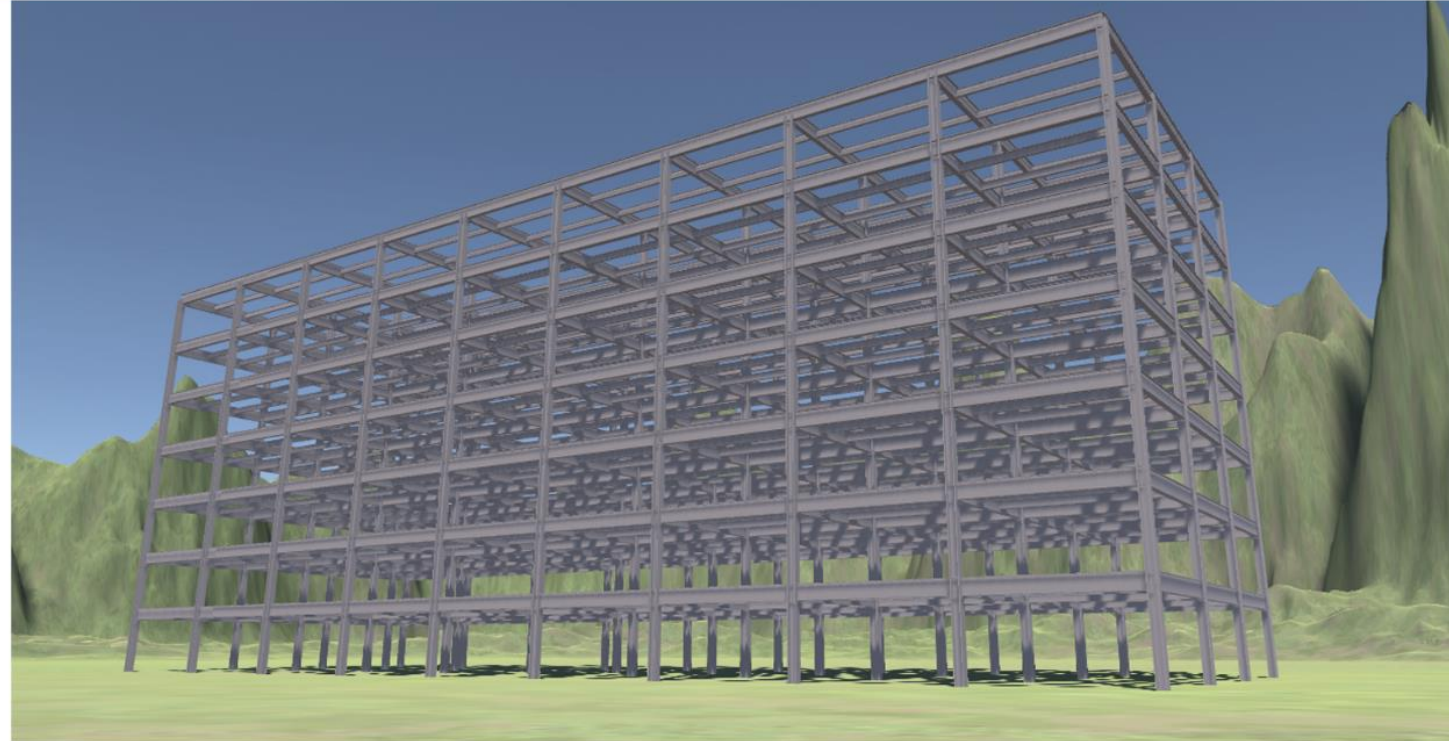
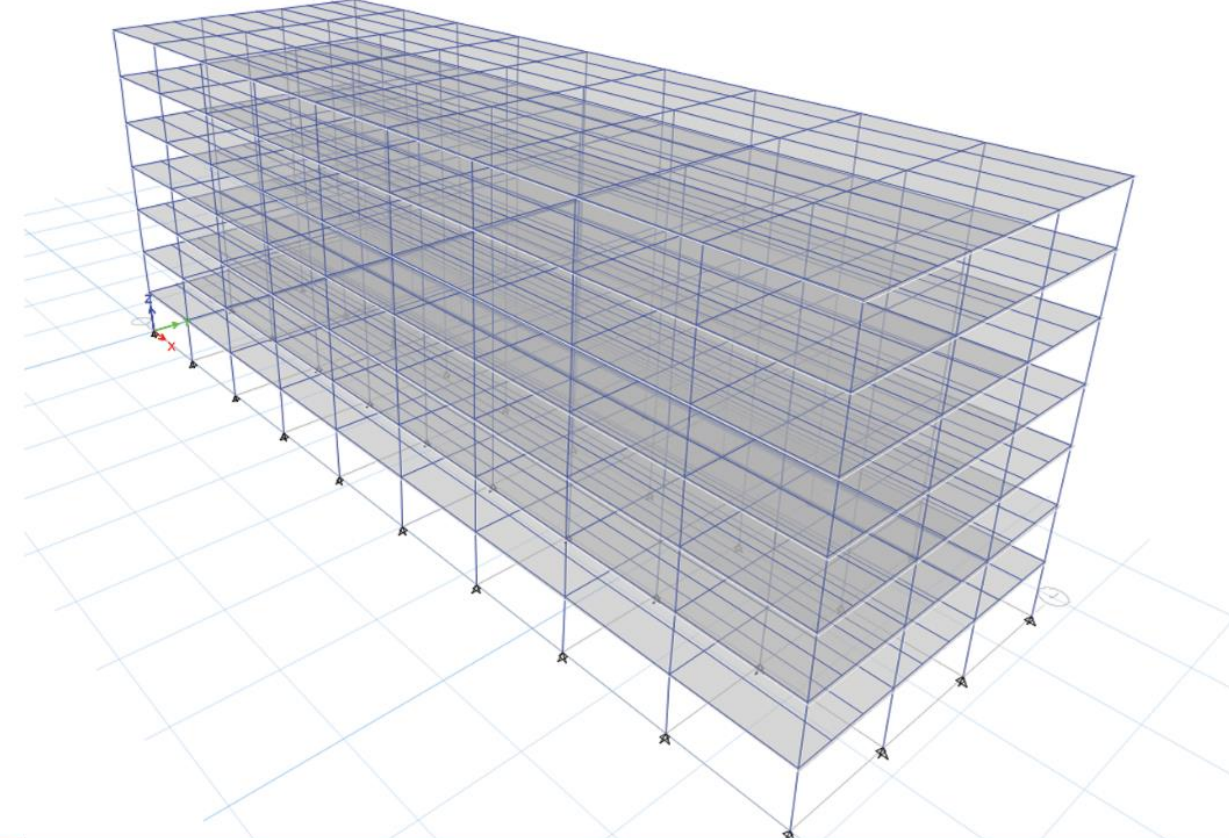
- STEPS: 1. OPEN ETABS "ETABS_GEOMETRY_ANALYTICS_FINAL.EDB". AND RUN ANALYSIS
2. AND OPEN DYNAMO AND ADD THE NODES ABOVE
- NOTES: 1. RESULTS SHOW LOAD CASE OR LOAD COMBO ALSO NOTE UNITS ARE IN LB-IN
2. IF THE NODE DOES NOT UPDATE PLACE A NEW NODE ON CANVAS

STEPS & NOTES

Exercise 7



Exercise 8

GET ETABS GEOMETRY TO GAME ENGINE		
THIS NODE WRITES THE ETABS GEOM. TO A .CSV FILE "TRANSFER FILE" THIS NODE SETS THE WHERE THE TRANSFER FILE IS LOCATED THIS NODE SETS THE INPUT PARAMETER ALWAYS "-Building +file loc" THIS NODE RUNS UNITY GAME ENGINE 	DYNAMO NODES	
	GAME ENGINE GEOMETRY	
	ETABS GEOMETRY	
STEPS: 1. OPEN ANY ETABS MODEL "ETABS MODEL VIEWER.EDB" OPEN DYNAMO 2. OPEN ADD THE NODES ABOVE NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL- 2. ONLY FRAMES ELEMENTS ARE SHOWN IN GAME ENGINE		STEPS & NOTES

