Rebar Detailing, Shop Drawings and Rebar CNC using Revit + Sofistik

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Project BIM Leader

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Class summary

This class shows how ICA use Revit Structure, Inventor and SOFiSTiK Structure Detailing for CNC Rebar Fabrication.

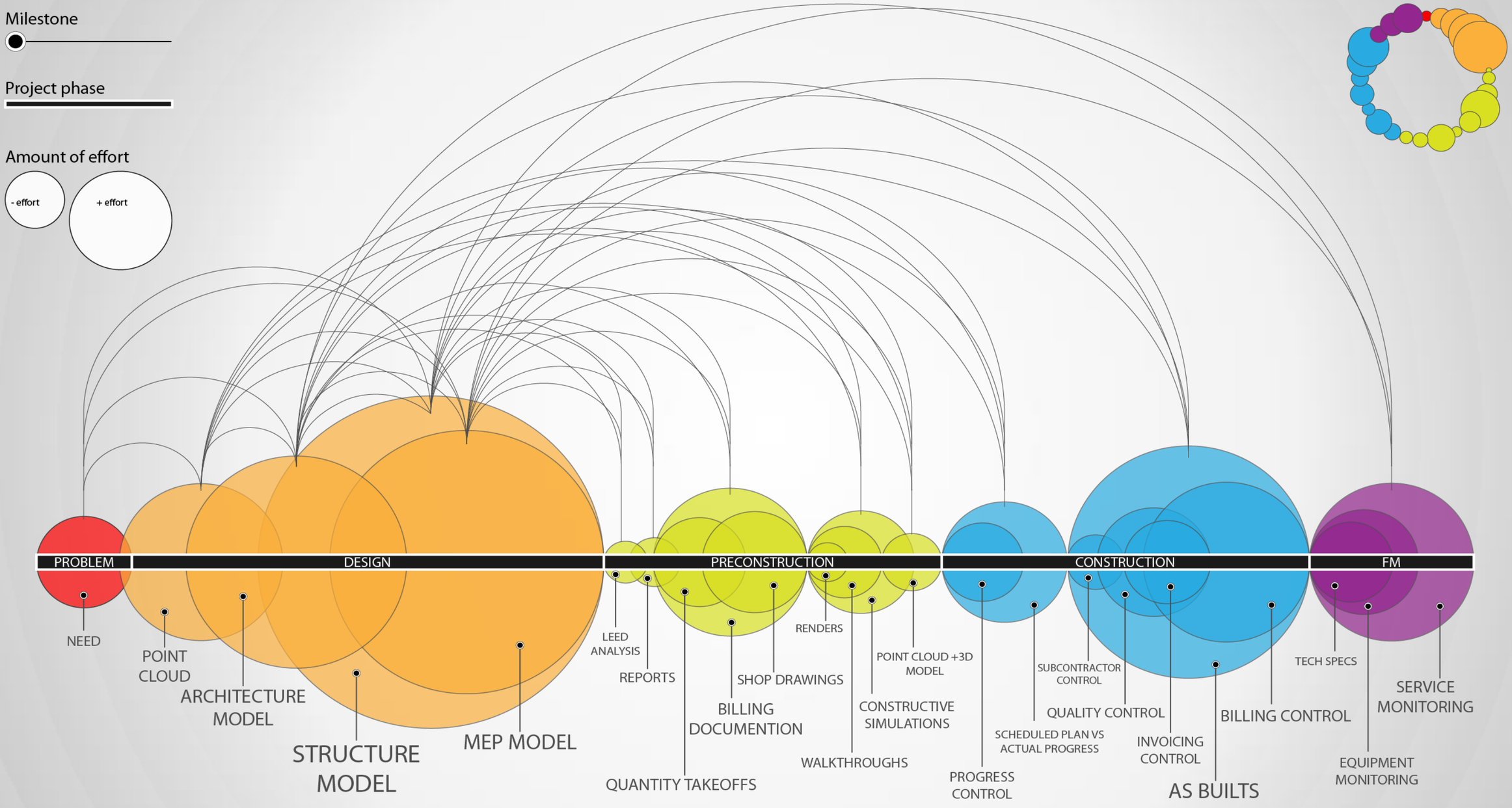
We show how to use point clouds for Quality Assurance (QA), and some in house apps for rebar modeling

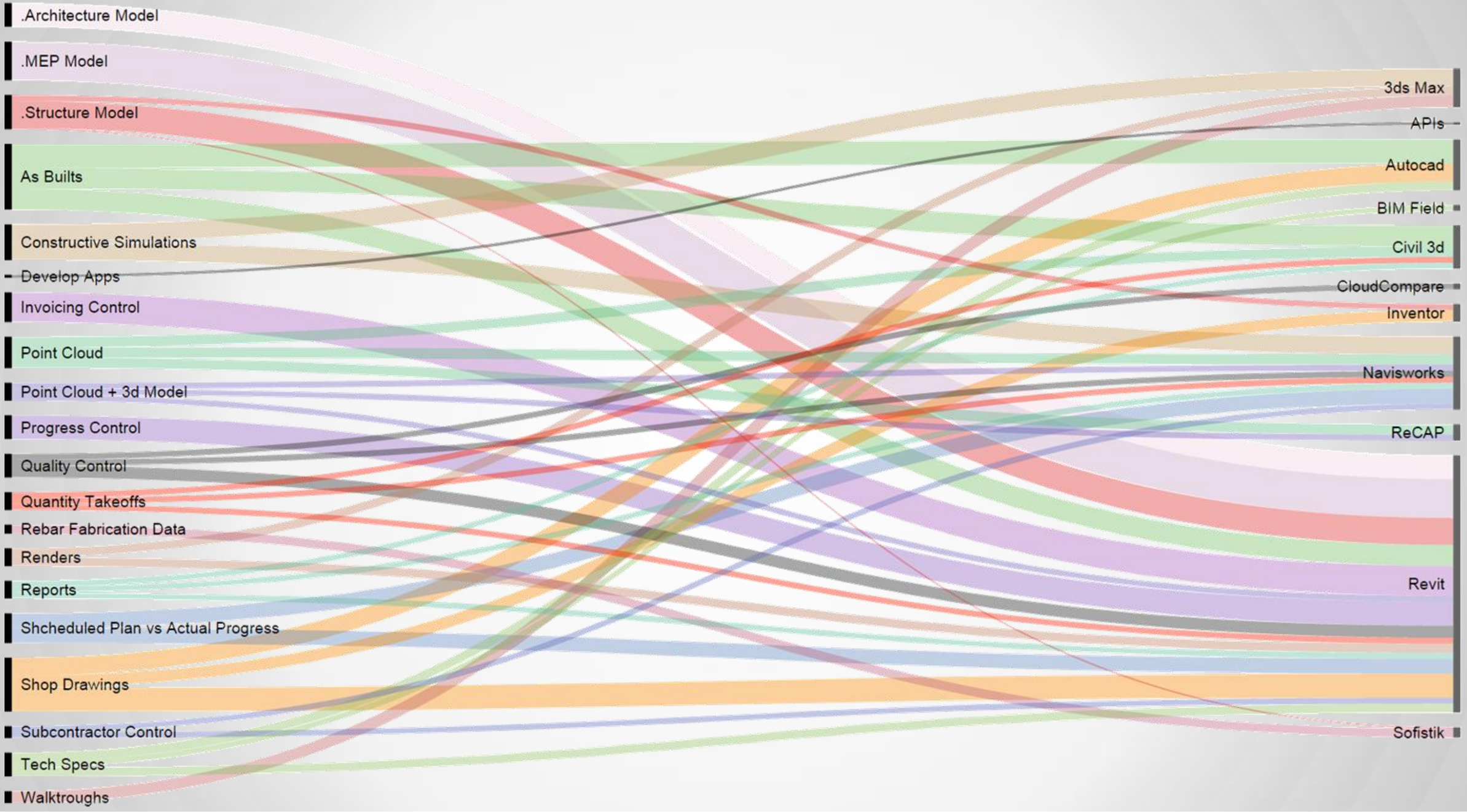
Key learning objectives

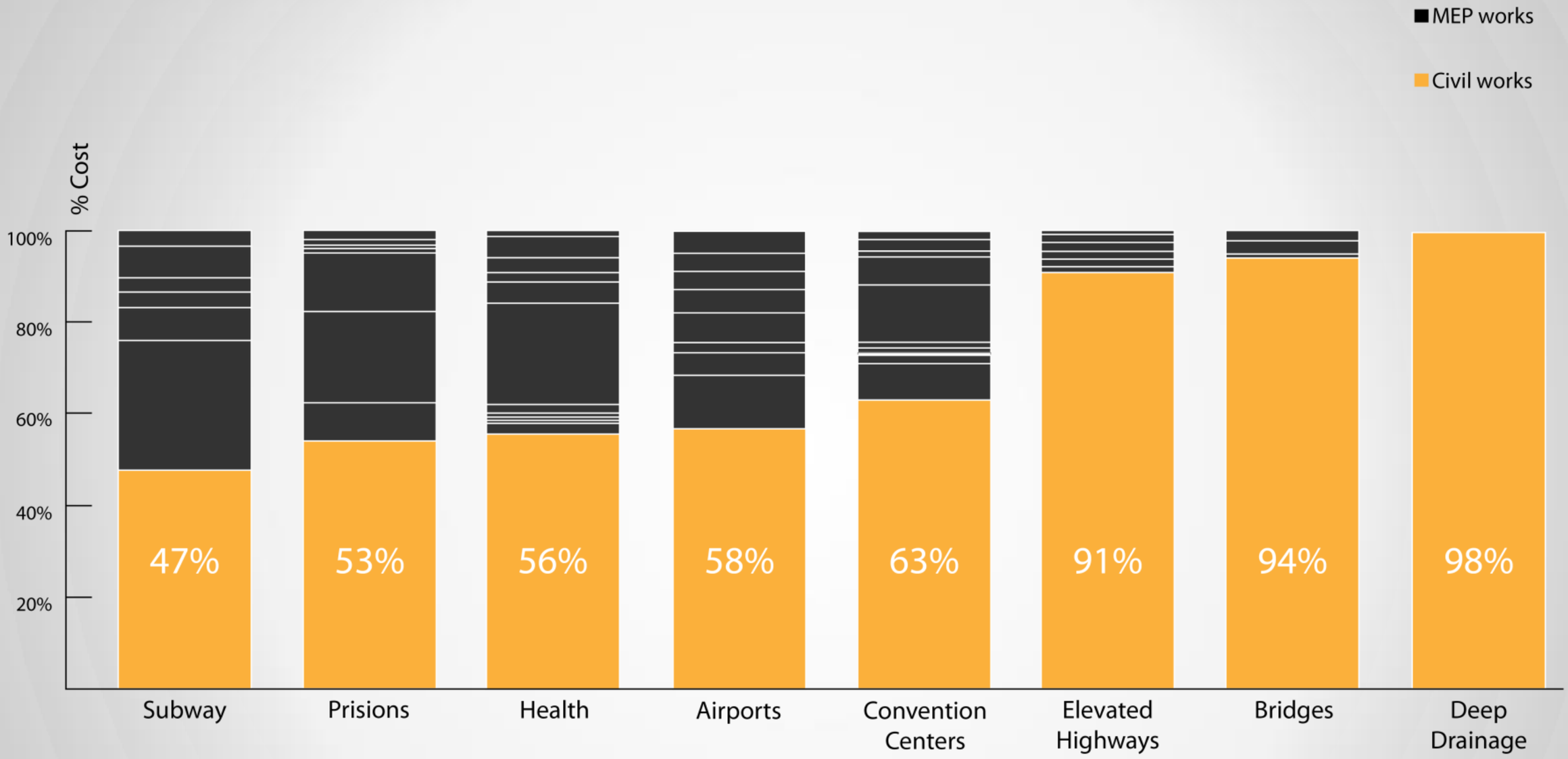
At the end of this class, you will be able to:

- Know how to use Revit for an effective shop drawing workflow
- Use SOFiSTiK Structural Detailing for exporting Rebar Data to a CNC rebar bending machines.
- Know some rebar tips and tricks
- Get ideas for using 3d scanner for QA.

Introduction


Milestone
Project phase
Amount of effort
- effort
+ effort
PROBLEM
DESIGN
PRECONSTRUCTION
CONSTRUCTION
FM
NEED
POINT CLOUD
ARCHITECTURE MODEL
STRUCTURE MODEL
MEP MODEL
LEED ANALYSIS
REPORTS
QUANTITY TAKEOFFS
BILLING DOCUMENTION
SHOP DRAWINGS
RENDERS
WALKTHROUGHS
CONSTRUCTIVE SIMULATIONS
POINT CLOUD +3D MODEL
PROGRESS CONTROL
SCHEDULED PLAN VS ACTUAL PROGRESS
SUBCONTRACTOR CONTROL
QUALITY CONTROL
INVOICING CONTROL
AS BUILTS
BILLING CONTROL
TECH SPECS
EQUIPMENT MONITORING
SERVICE MONITORING


.Architecture Model
.MEP Model
.Structure Model
As Builts
Constructive Simulations
Develop Apps
Invoicing Control
Point Cloud
Point Cloud + 3d Model
Progress Control
Quality Control
Quantity Takeoffs
Rebar Fabrication Data
Renders
Reports
Shcheduled Plan vs Actual Progress
Shop Drawings
Subcontractor Control
Tech Specs
Walktroughs
3ds Max
APIs
Autocad
BIM Field
Civil 3d
CloudCompare
Inventor
Navisworks
ReCAP
Revit
Sofistik

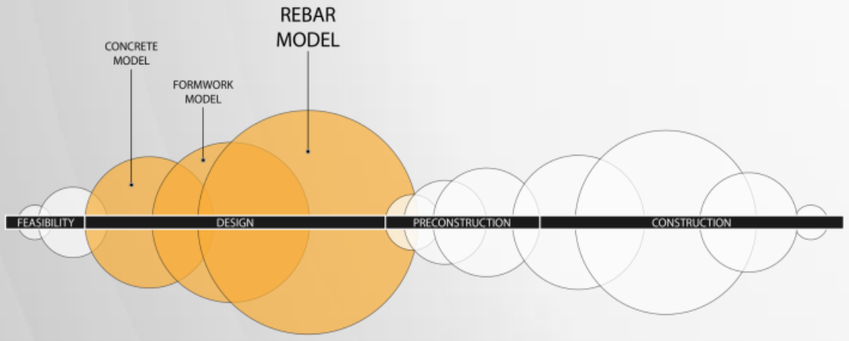


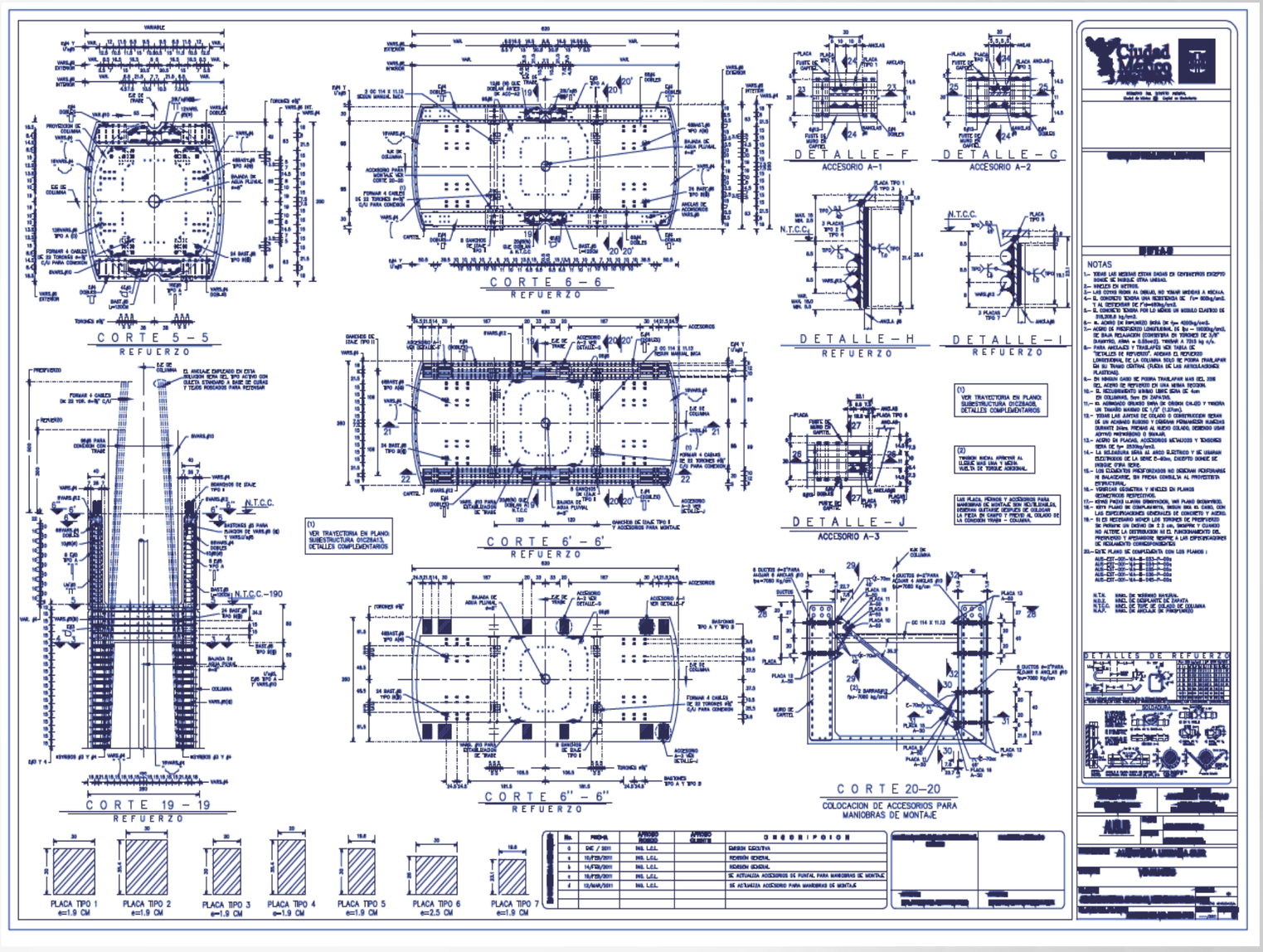
Source: ICA CU, ICA CE , PRET and Bimsa Reports

Workflow

1

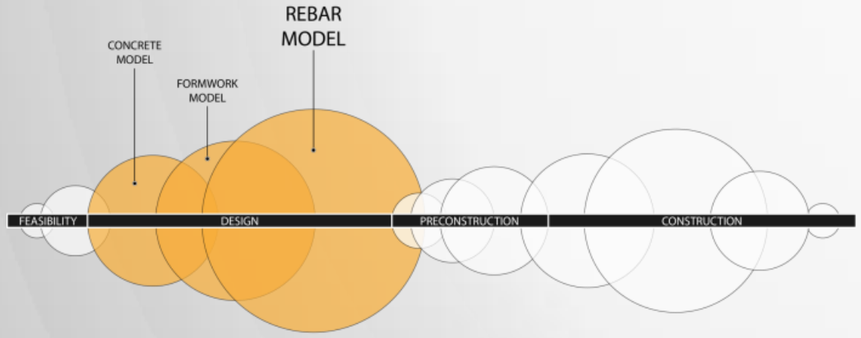
PROJECT INPUT.

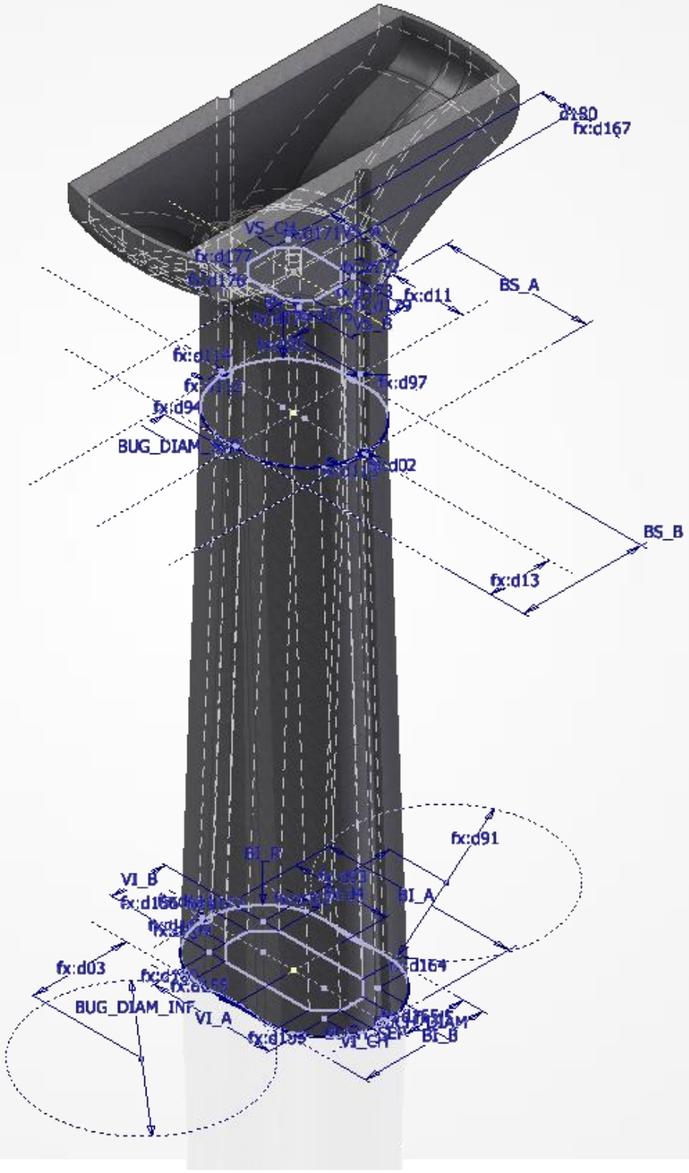




2

BIM MODEL.


REBAR
MODEL
CONCRETE
MODEL
FORMWORK
MODEL
FEASIBILITY
DESIGN
PRECONSTRUCTION
CONSTRUCTION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BS_B
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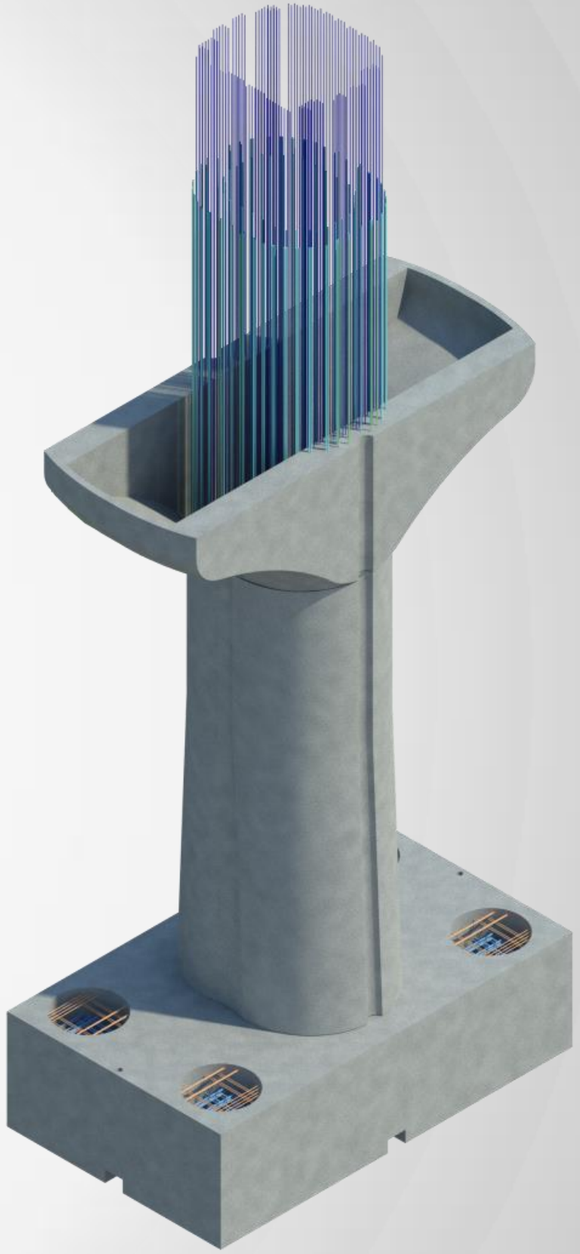
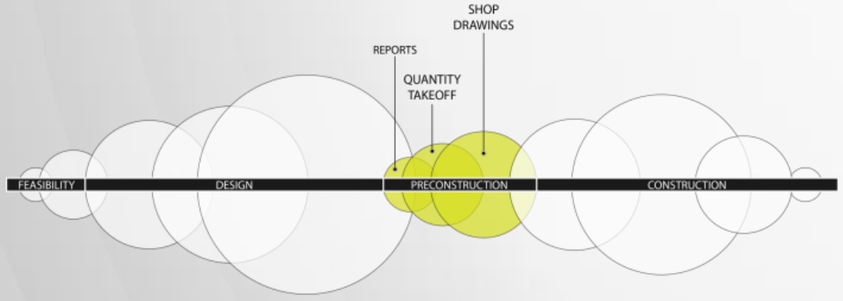
VI_B
BI_A
fx:d03
d164
BUG_DIAM_INF
VI_A
VI_CH
BI_B



3

REPORTS.



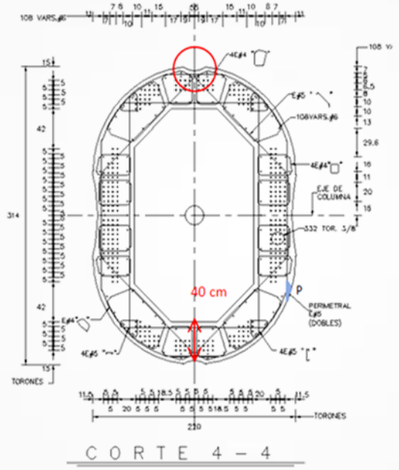
Reporte AS-CZ6A11-001

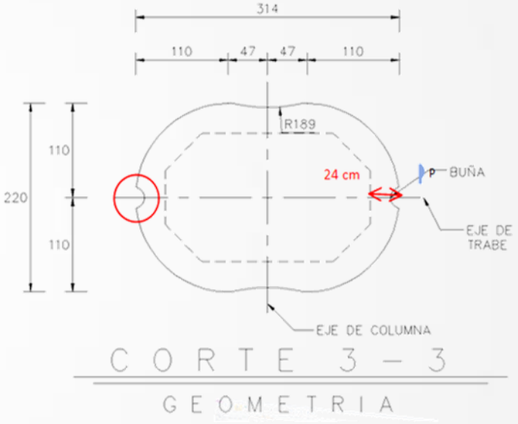
martes, 05 de octubre de 2010
01:17 p.m.

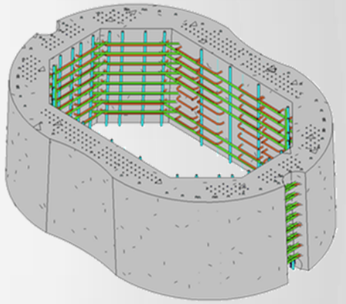
No.Proyecto 10_009_Arco-Sur B

Revisión de Proyecto

Clave Reporte	Pieza	Nivel	Plano	Estado	No.	Elemento	Descripción	Solución	Tipo	Ejes	Reportó	Soluciono	Fecha Reportado	Fecha Entregado	Fecha resuelto	
001	CZ6A11	-	01CZ6A11			Fuste	El Aligeramiento y las buñas del fuste en el plano de geometría no coincide con el aligeramiento en el plano de acero de refuerzo			-	PLA		09/11/2010			B P





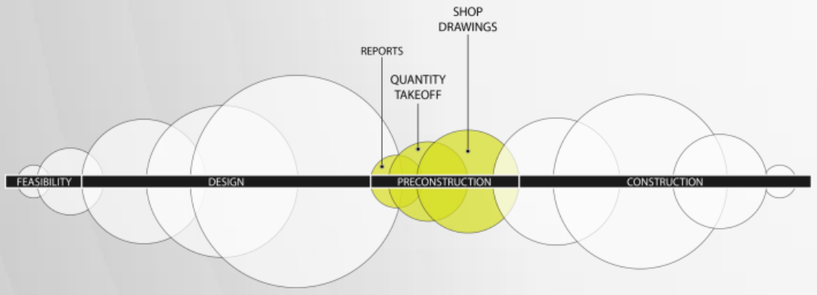


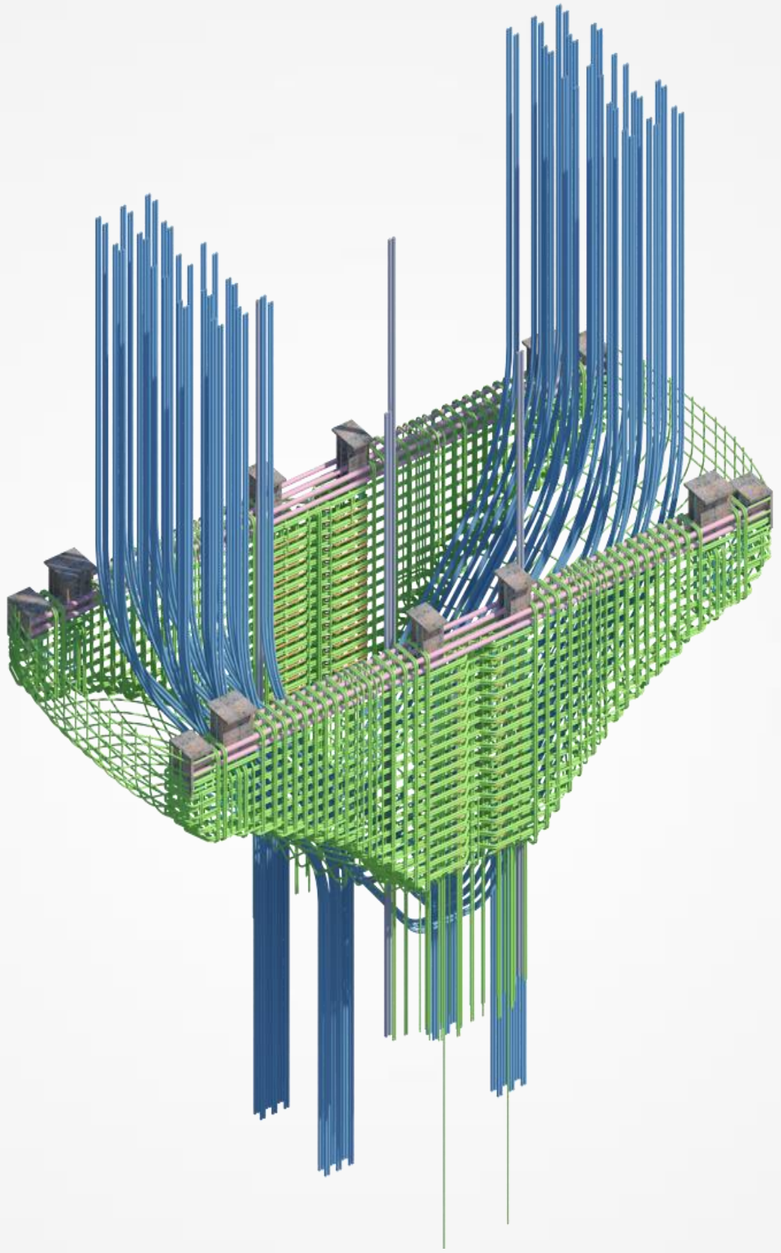
PLANO:
SUBESTRUCTURA 01CZ6A11, REFUERZO 2 DE 2

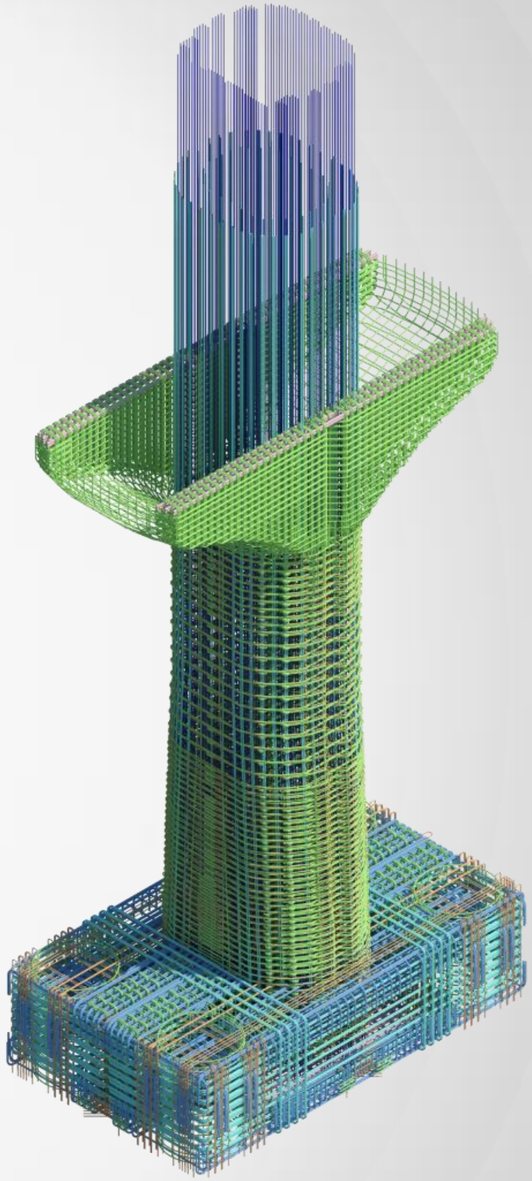
PLANO:
SUBESTRUCTURA 1CZ6A11,GEOMETRÍA 1 DE 2 P

4

SOLUTION.

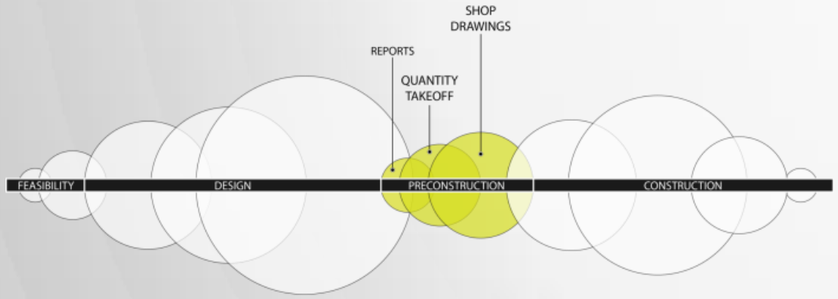

SHOP
DRAWINGS
REPORTS
QUANTITY
TAKEOFF
FEASIBILITY
DESIGN
PRECONSTRUCTION
CONSTRUCTION





5

QUANTITY TAKEOFF.



03 - Acero en Capitel

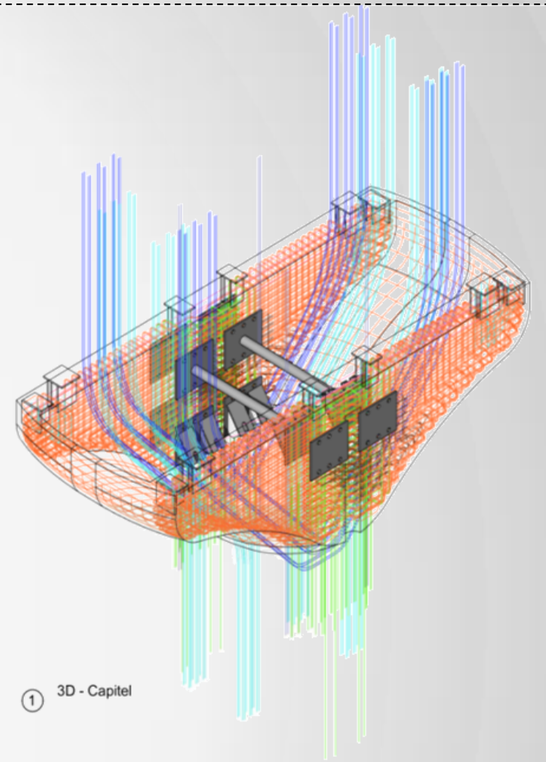
Codigo	Diametro (mm)	Longitud Unitaria	Cantidad	Suma Longitudinal	Peso Lineal	Peso Total (Kg)	Volumen de Acero
Accesorio							
#06							
CA02	19 mm	0.54 m	20	10.72 m	2.25	24.12	0.0031 m³
CA02	19 mm	0.83 m	20	16.60 m	2.25	37.35	0.0048 m³
CA03	19 mm	0.81 m	16	13.01 m	2.25	29.27	0.0037 m³
			56	40.33 m		90.73	0.0116 m³
#12							
CA01	38 mm	5.65 m	12	67.82 m	8.938	606.21	0.0773 m³
CA04	38 mm	2.00 m	4	8.00 m	8.938	71.50	0.0091 m³
			16	75.82 m		677.71	0.0864 m³
			72	116.15 m		768.45	0.0980 m³
Capitel							
#03							
CE06	10 mm	1.35 m	64	86.53 m	0.56	48.46	0.0061 m³
			64	86.53 m		48.46	0.0061 m³
#04							
CE01	13 mm	3.54 m	4	14.15 m	0.996	14.09	0.0018 m³
CE01	13 mm	3.59 m	4	14.34 m	0.996	14.28	0.0018 m³
CE01	13 mm	3.66 m	4	14.65 m	0.996	14.60	0.0019 m³
CE01	13 mm	3.71 m	4	14.84 m	0.996	14.78	0.0019 m³
CE01	13 mm	3.74 m	4	14.97 m	0.996	14.91	0.0019 m³
CE01	13 mm	3.76 m	12	45.17 m	0.996	44.99	0.0057 m³
CE02	13 mm	2.98 m	2	5.95 m	0.996	5.93	0.0008 m³
CE02	13 mm	2.99 m	18	53.90 m	0.996	53.68	0.0068 m³
CE02	13 mm	3.12 m	2	6.25 m	0.996	6.22	0.0008 m³
CE02	13 mm	3.15 m	2	6.29 m	0.996	6.27	0.0008 m³
CE02	13 mm	3.17 m	2	6.35 m	0.996	6.32	0.0008 m³
CE02	13 mm	3.29 m	1	3.29 m	0.996	3.28	0.0004 m³
CE02	13 mm	3.31 m	2	6.62 m	0.996	6.59	0.0008 m³
CE02	13 mm	3.35 m	4	13.39 m	0.996	13.34	0.0017 m³
CE02	13 mm	3.51 m	4	14.04 m	0.996	13.98	0.0018 m³
CE03	13 mm	2.26 m	2	4.51 m	0.996	4.49	0.0006 m³
CE03	13 mm	2.94 m	2	5.87 m	0.996	5.85	0.0007 m³
CE03	13 mm	3.31 m	2	6.63 m	0.996	6.60	0.0008 m³
CE03	13 mm	3.36 m	1	3.36 m	0.996	3.35	0.0004 m³
CE03	13 mm	3.46 m	4	13.84 m	0.996	13.79	0.0018 m³
CE04	13 mm	1.60 m	8	12.76 m	0.996	12.71	0.0016 m³
CE04	13 mm	1.73 m	8	13.87 m	0.996	13.81	0.0018 m³
CE04	13 mm	1.81 m	8	14.52 m	0.996	14.46	0.0018 m³
CE04	13 mm	1.95 m	8	15.63 m	0.996	15.57	0.0020 m³
CE04	13 mm	2.10 m	8	16.81 m	0.996	16.74	0.0021 m³
CE04	13 mm	2.26 m	8	18.09 m	0.996	18.01	0.0023 m³
CE04	13 mm	2.39 m	8	19.13 m	0.996	19.05	0.0024 m³
CE04	13 mm	2.57 m	8	20.60 m	0.996	20.52	0.0026 m³
CE04	13 mm	2.78 m	8	22.21 m	0.996	22.12	0.0028 m³
CE04	13 mm	3.02 m	8	24.16 m	0.996	24.06	0.0031 m³
CE04	13 mm	3.33 m	8	26.64 m	0.996	26.53	0.0034 m³
CE04	13 mm	3.64 m	8	29.11 m	0.996	29.00	0.0037 m³
CE04	13 mm	3.78 m	8	30.25 m	0.996	30.13	0.0038 m³
CE04	13 mm	3.80 m	8	30.43 m	0.996	30.30	0.0039 m³
CE04	13 mm	3.83 m	24	92.00 m	0.996	91.63	0.0117 m³
CE05	13 mm	2.86 m	4	11.44 m	0.996	11.40	0.0014 m³
CE05	13 mm	3.01 m	4	12.05 m	0.996	12.00	0.0015 m³
CE05	13 mm	3.23 m	4	12.92 m	0.996	12.87	0.0016 m³
CE05	13 mm	3.57 m	4	14.28 m	0.996	14.22	0.0018 m³
CE05	13 mm	3.65 m	4	14.60 m	0.996	14.54	0.0018 m³
CE05	13 mm	3.71 m	4	14.82 m	0.996	14.76	0.0019 m³
CE05	13 mm	3.96 m	4	15.84 m	0.996	15.77	0.0020 m³
CE05	13 mm	4.35 m	4	17.41 m	0.996	17.34	0.0022 m³
CE05	13 mm	4.72 m	4	18.89 m	0.996	18.82	0.0024 m³
CE05	13 mm	5.12 m	4	20.49 m	0.996	20.40	0.0026 m³
CE05	13 mm	5.59 m	4	22.35 m	0.996	22.26	0.0028 m³
CE05	13 mm	6.48 m	4	25.93 m	0.996	25.83	0.0033 m³
CE05	13 mm	6.64 m	4	26.57 m	0.996	26.47	0.0034 m³

03 - Acero en Capitel

Codigo	Diametro (mm)	Longitud Unitaria	Cantidad	Suma Longitudinal	Peso Lineal	Peso Total (Kg)	Volumen de Acero
CE05	13 mm	6.79 m	16	108.57 m	0.996	108.13	0.0138 m³
CE08	13 mm	1.49 m	8	11.93 m	0.996	11.88	0.0015 m³
CE08	13 mm	1.90 m	12	22.82 m	0.996	22.73	0.0029 m³
CE08	13 mm	2.02 m	12	24.19 m	0.996	24.09	0.0031 m³
CE08	13 mm	2.33 m	8	18.65 m	0.996	18.57	0.0024 m³
CE08	13 mm	2.35 m	8	18.79 m	0.996	18.71	0.0024 m³
CE08	13 mm	2.54 m	8	20.32 m	0.996	20.24	0.0026 m³
CE08	13 mm	2.60 m	8	20.80 m	0.996	20.72	0.0026 m³
CE08	13 mm	2.72 m	8	21.76 m	0.996	21.67	0.0028 m³
CE08	13 mm	2.80 m	8	22.40 m	0.996	22.31	0.0028 m³
CE08	13 mm	2.90 m	8	23.24 m	0.996	23.14	0.0029 m³
CE08	13 mm	2.98 m	8	23.86 m	0.996	23.76	0.0030 m³
CE08	13 mm	3.08 m	8	24.61 m	0.996	24.51	0.0031 m³
CE08	13 mm	3.17 m	8	25.32 m	0.996	25.22	0.0032 m³
CE08	13 mm	3.28 m	8	26.24 m	0.996	26.13	0.0033 m³
CE08	13 mm	3.40 m	4	13.60 m	0.996	13.54	0.0017 m³
CE08	13 mm	3.50 m	4	14.01 m	0.996	13.95	0.0018 m³
CE08	13 mm	3.58 m	8	28.63 m	0.996	28.51	0.0036 m³
CE08	13 mm	3.68 m	4	14.73 m	0.996	14.67	0.0019 m³
CE08	13 mm	3.78 m	4	15.14 m	0.996	15.08	0.0019 m³
CE08	13 mm	3.93 m	8	31.41 m	0.996	31.28	0.0040 m³
CE08	13 mm	4.09 m	8	32.74 m	0.996	32.61	0.0041 m³
CE08	13 mm	4.33 m	8	34.65 m	0.996	34.51	0.0044 m³
CE08	13 mm	4.48 m	8	35.83 m	0.996	35.69	0.0045 m³
			460	1,516.44 m		1,510.37	0.1921 m³
#05							
CB03	16 mm	1.20 m	68	81.60 m	1.56	127.30	0.0162 m³
CE07	16 mm	5.99 m	8	47.88 m	1.56	74.69	0.0095 m³
CE07	16 mm	6.16 m	8	49.31 m	1.56	76.93	0.0098 m³
CE09	16 mm	6.06 m	4	24.24 m	1.56	37.81	0.0048 m³
CE09	16 mm	6.10 m	8	48.79 m	1.56	76.12	0.0097 m³
CE09	16 mm	6.11 m	4	24.43 m	1.56	38.11	0.0049 m³
CE09	16 mm	6.12 m	4	24.49 m	1.56	38.20	0.0049 m³
CE09	16 mm	6.15 m	8	49.20 m	1.56	76.74	0.0098 m³
CE10	16 mm	5.11 m	8	40.87 m	1.56	63.76	0.0081 m³
			120	390.81 m		609.66	0.0776 m³
#06							
CB01	19 mm	7.42 m	16	118.76 m	2.25	267.22	0.0340 m³
CB01	19 mm	7.47 m	16	119.49 m	2.25	268.84	0.0342 m³
CB01	19 mm	7.53 m	16	120.45 m	2.25	271.02	0.0345 m³
			48	358.71 m		807.09	0.1028 m³
#08							
CB02	25 mm	11.69 m	4	46.75 m	3.975	185.84	0.0237 m³
CB02	25 mm	11.77 m	4	47.09 m	3.975	187.18	0.0239 m³
CB02	25 mm	12.30 m	4	49.20 m	3.975	195.56	0.0249 m³
CB02	25 mm	12.40 m	4	49.60 m	3.975	197.15	0.0251 m³
CB02	25 mm	12.95 m	4	51.80 m	3.975	205.91	0.0262 m³
CB02	25 mm	13.05 m	4	52.20 m	3.975	207.50	0.0265 m³
			24	296.64 m		1,179.14	0.1503 m³
#10							
CC01	32 mm	4.94 m	8	39.50 m	6.225	245.86	0.0314 m³
			8	39.50 m		245.86	0.0314 m³
			724	2,688.62 m		4,400.58	0.5603 m³
736			796	2,804.77 m		5,169.03	0.6583 m³

Volumetria Capitel

Pertenece a	No Pieza	Volumen
Capitel	CZ6A11	7.762 m³
		7.762 m³



1 3D - Capitel

ICA bim — building information modeling

PRET

Proyecto:
A5 - Columna 6 Carriles - 11 mts
CZ6A11 - 1100
Modelo No: **03**
NP: **1**
No. de Proyecto:
10_009
Dirección:

Reporte:
Resumen de Acero - Capitel
Descripción:
Version No: 20110404

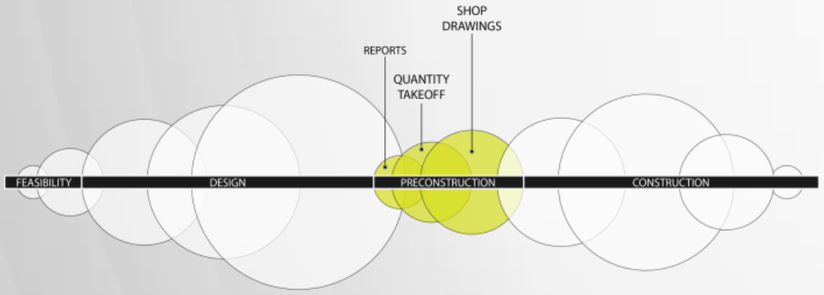
Nota:
ICA BIM no se hace responsable del diseño, esto corre a cuenta del cliente.

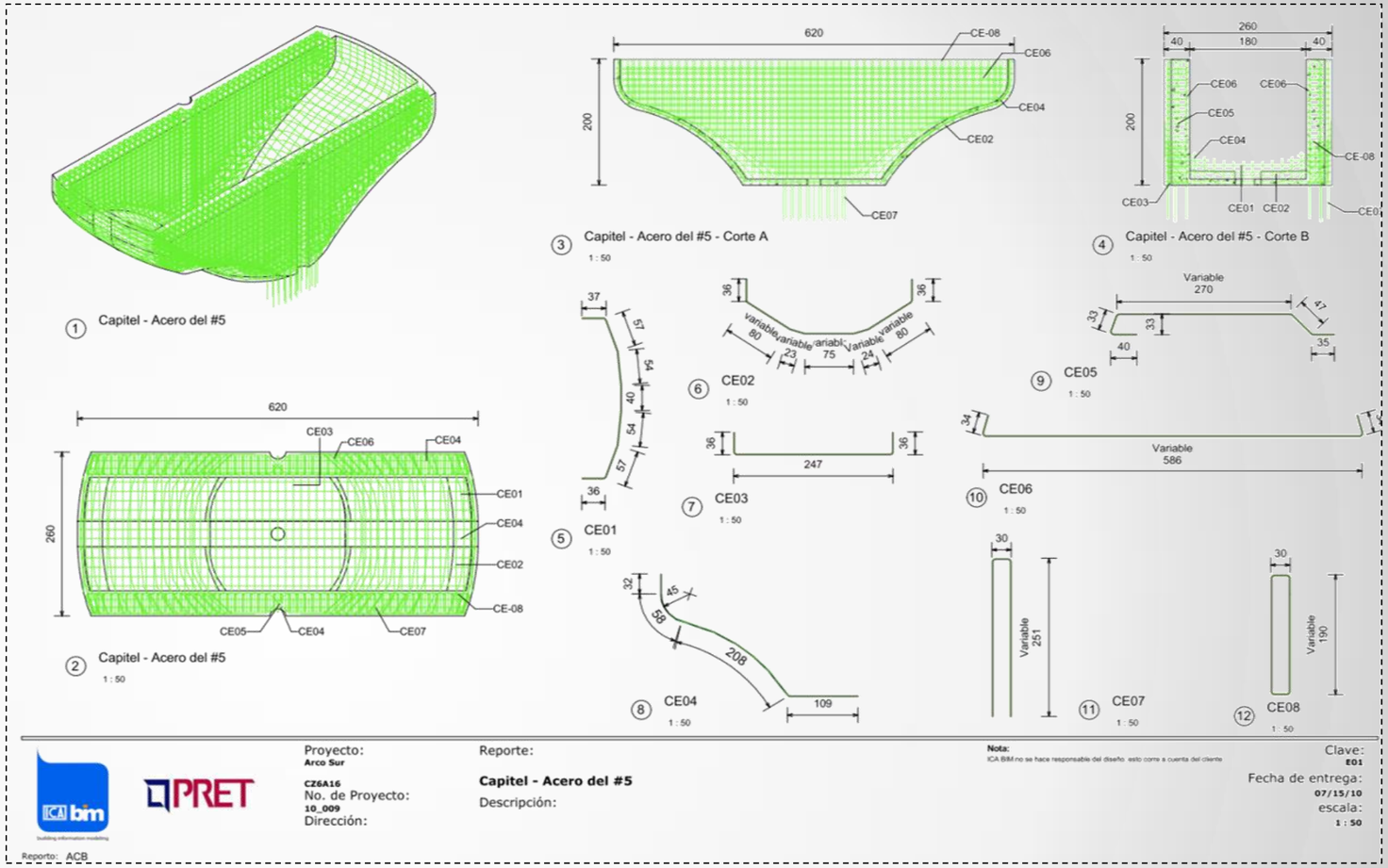
Clave:
EC00D
Fecha de entrega:
20/04/2011
escala:

Reporto: STG

6

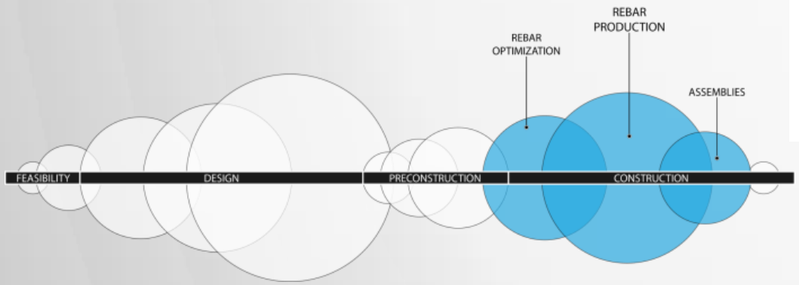
SHOP DRAWINGS.

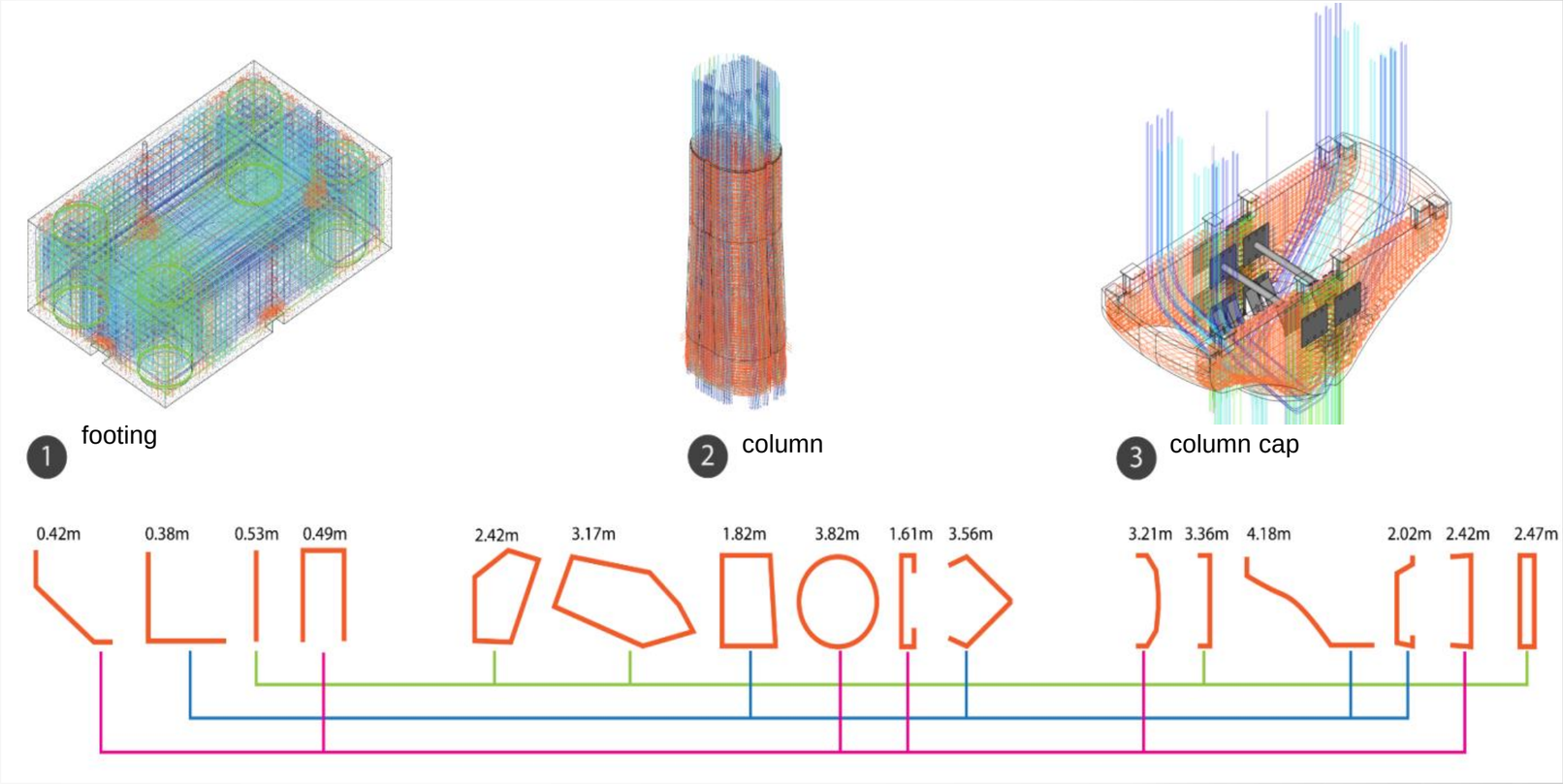




7

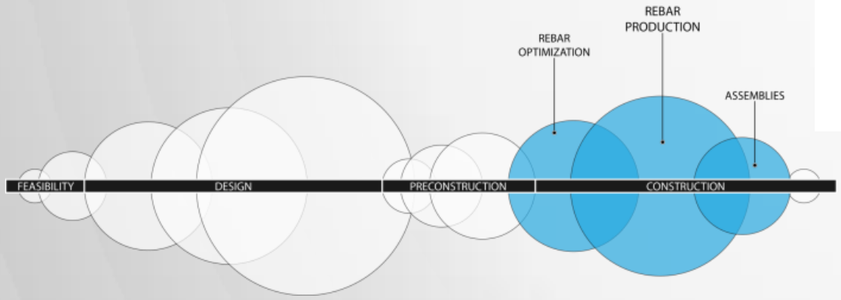
REBAR OPTIMIZATION.

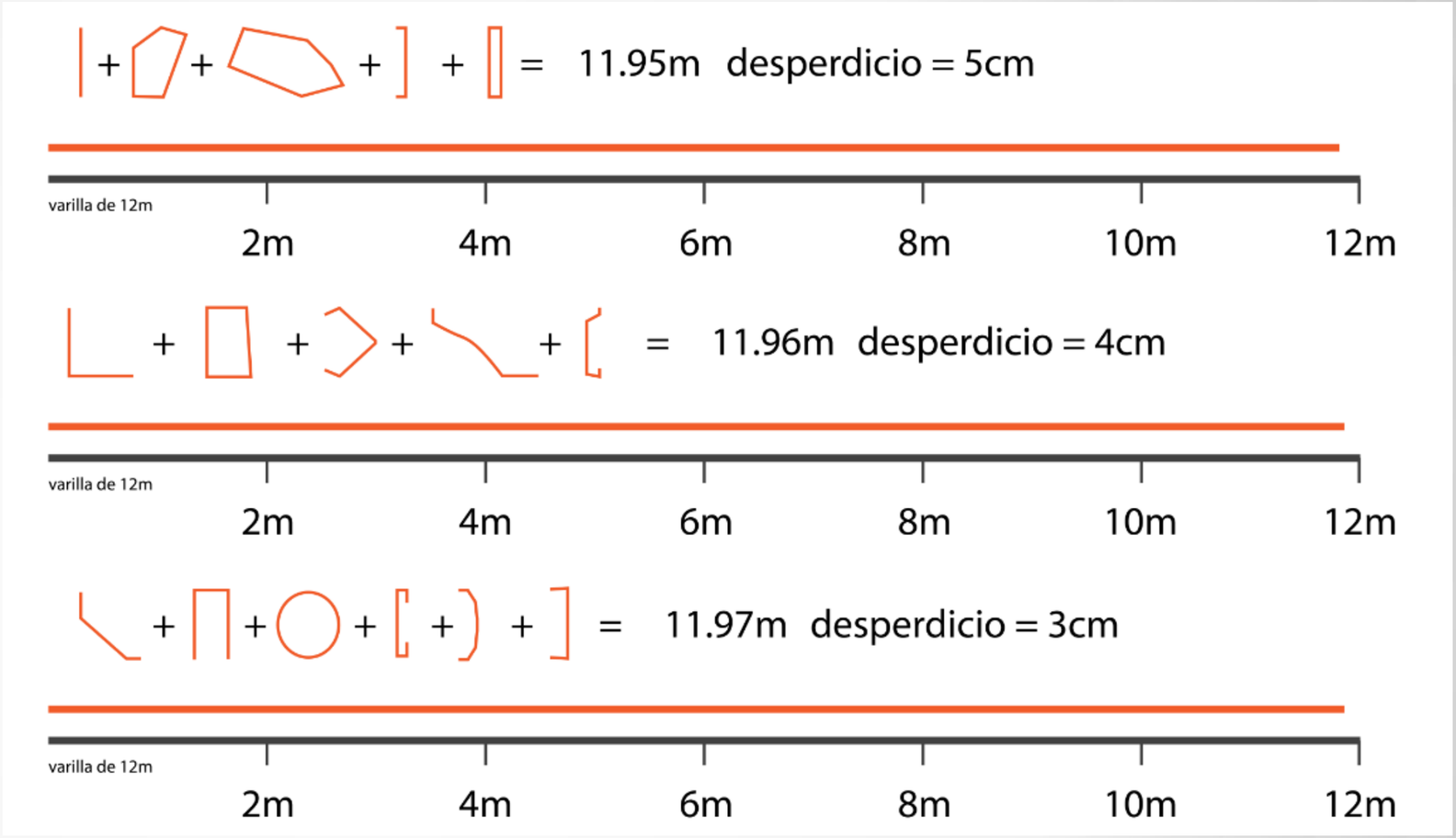




8

REBAR OPTIMIZATION.



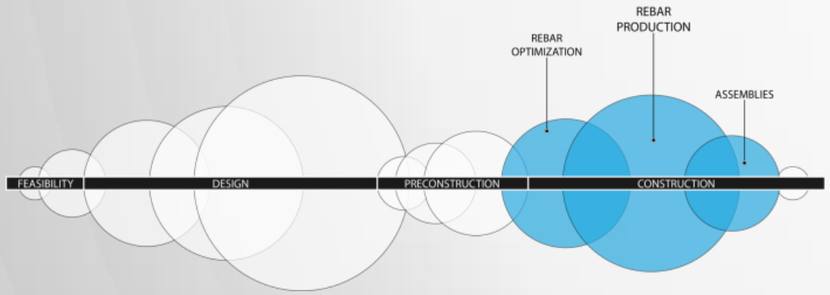


9

Hand made production 1,500 ton = **400 people** in 1 month

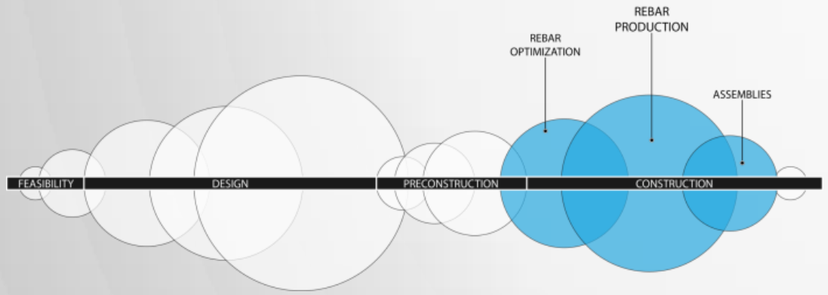
Rebar production plant 1,500 ton = **20 people** in 1 month

REBAR PRODUCTION.



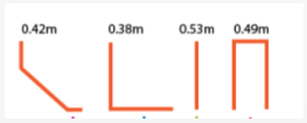
10

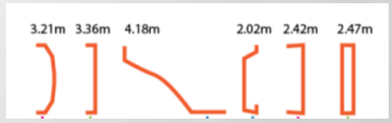
REBAR ASSEMBLIES.



Less Equipment, accidents, cost and waste

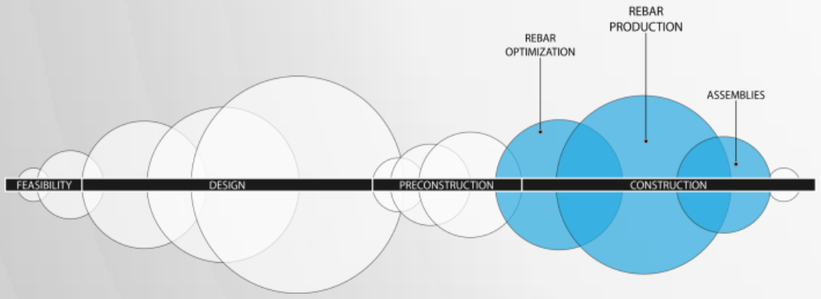
More Quality, control and performance

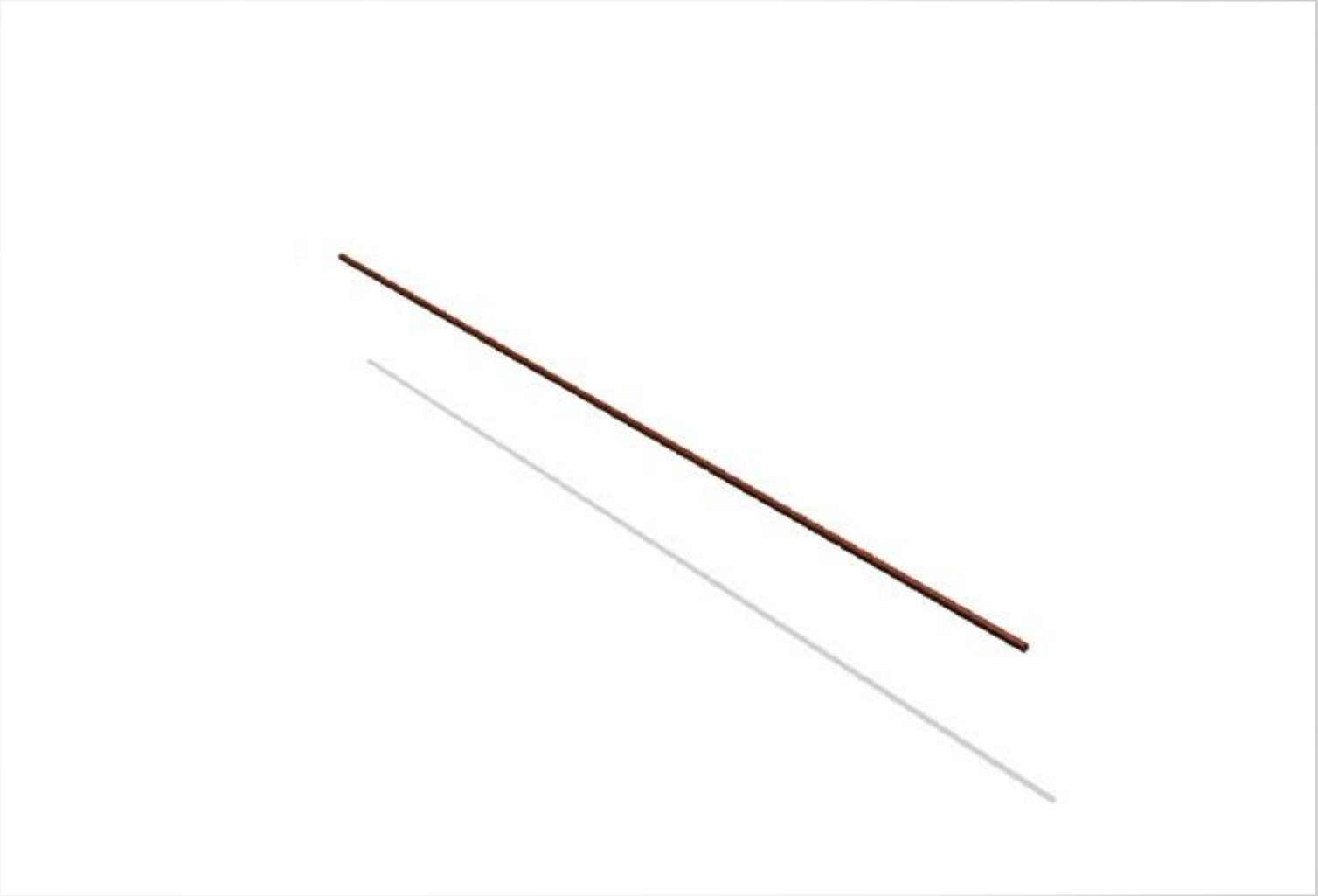




11

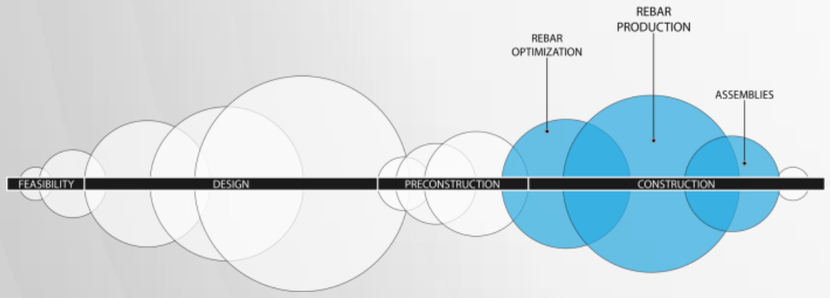
ASSEMBLIES MANUAL.

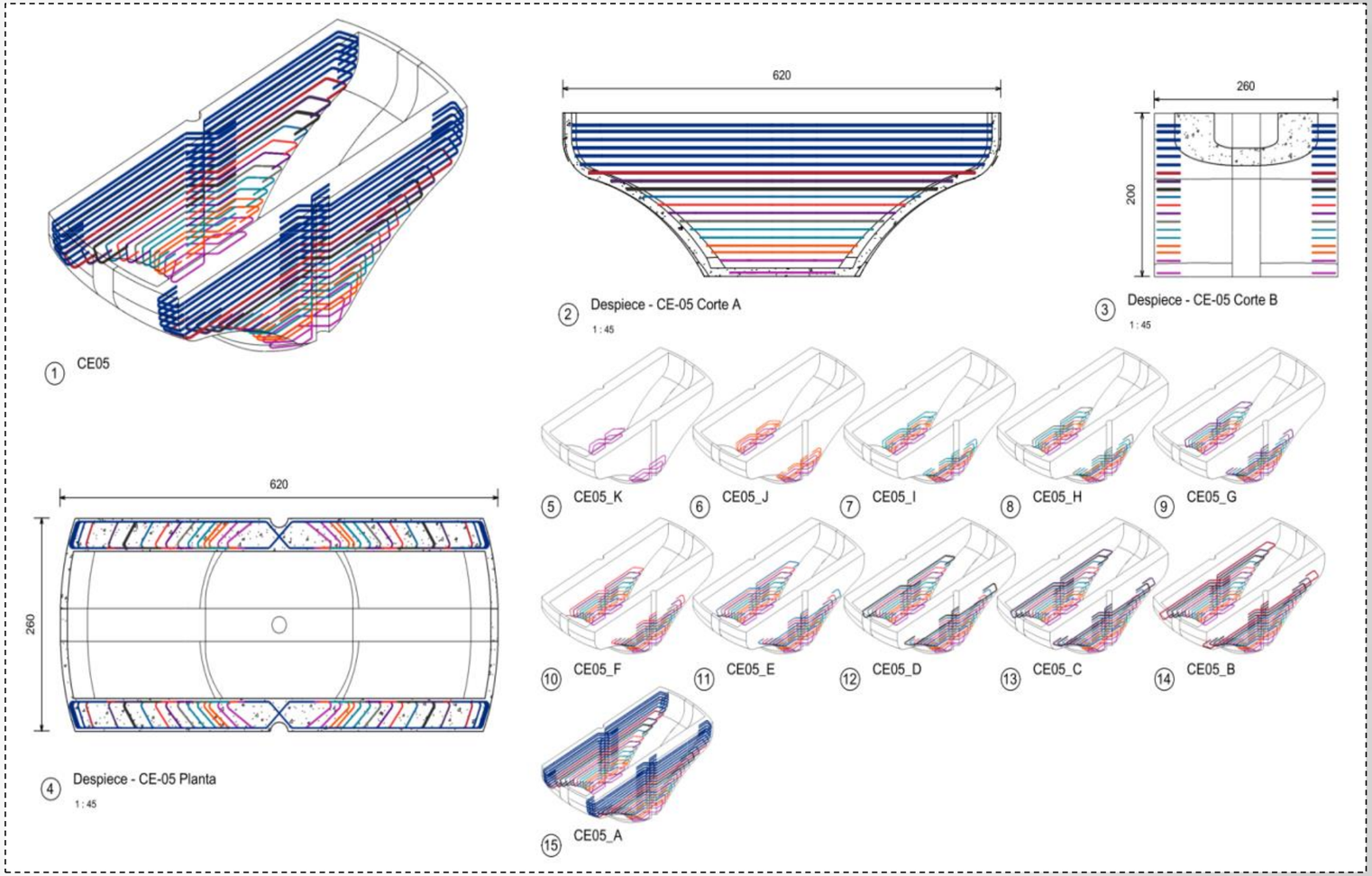




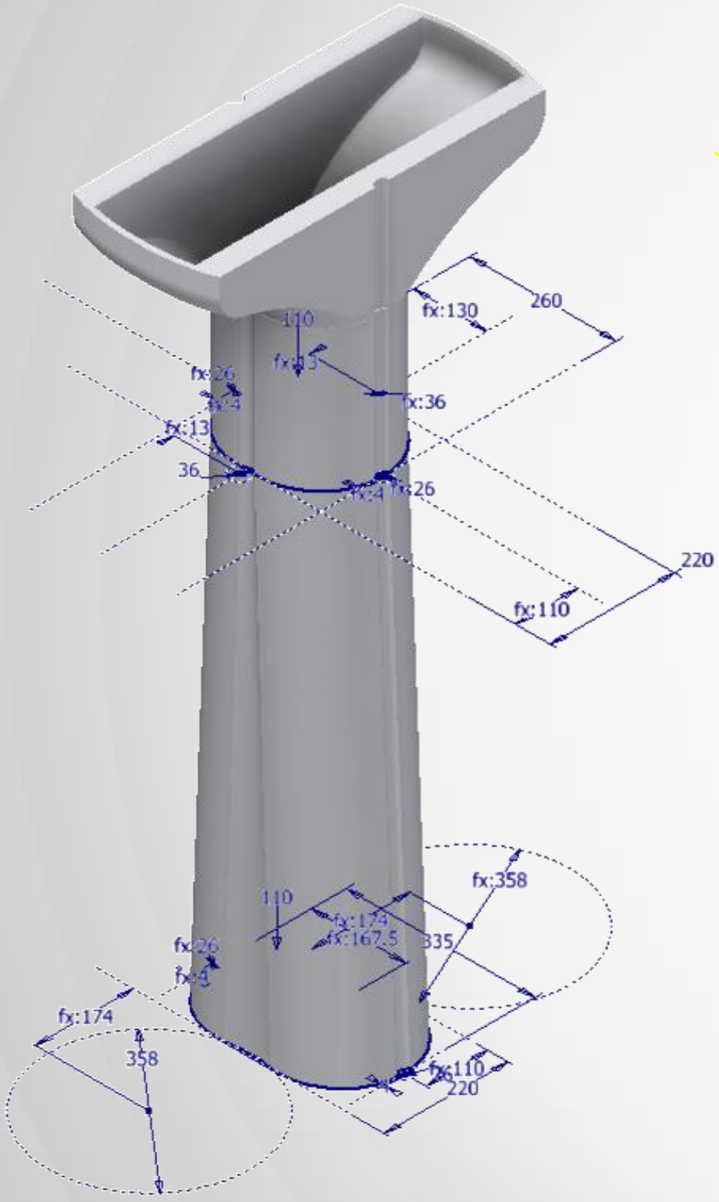
12

ASSEMBLIES MANUAL.





Inventor Parts and Assemblies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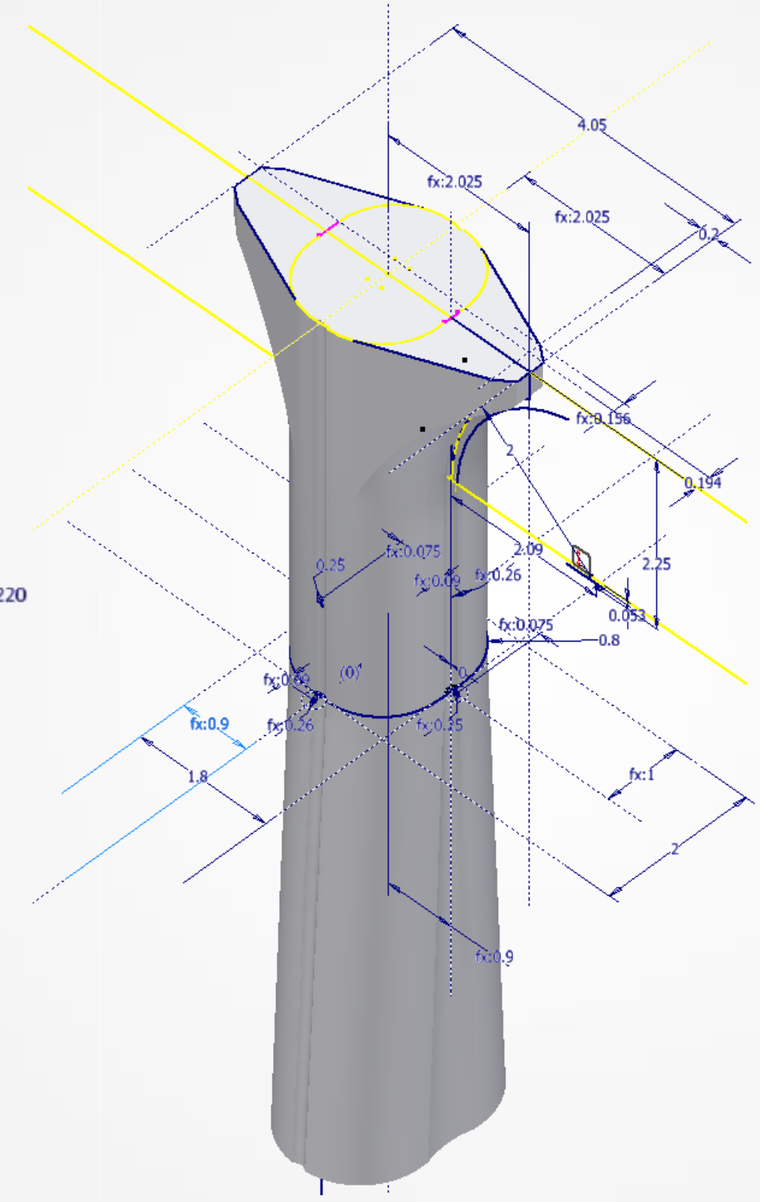
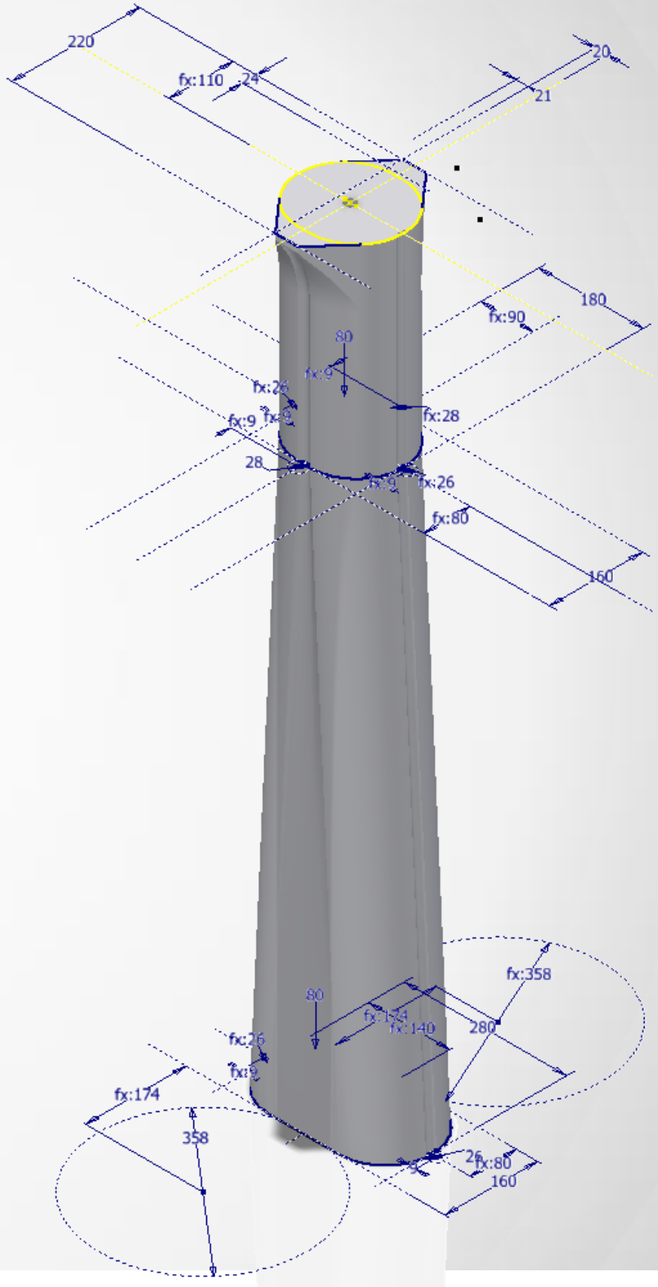
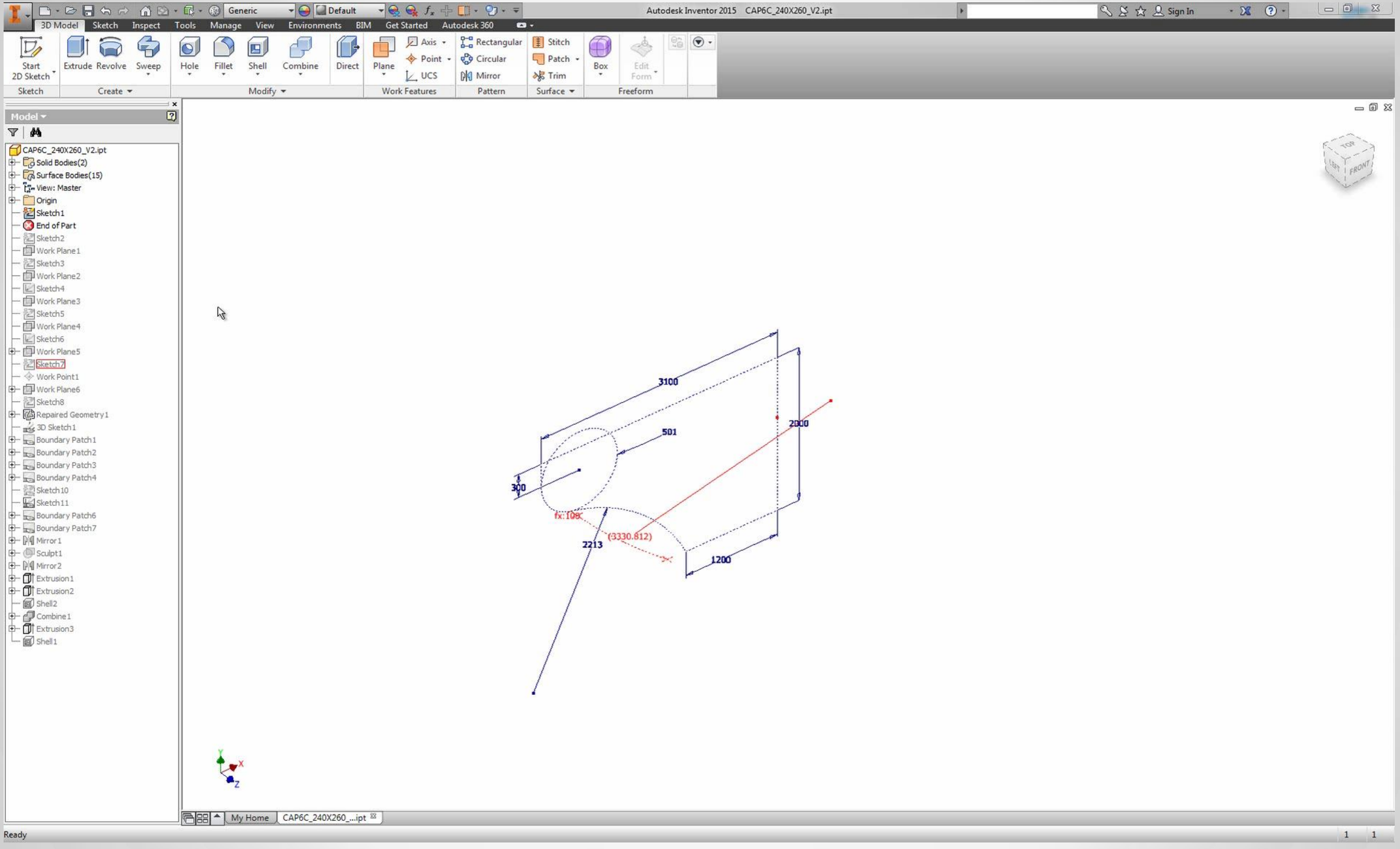
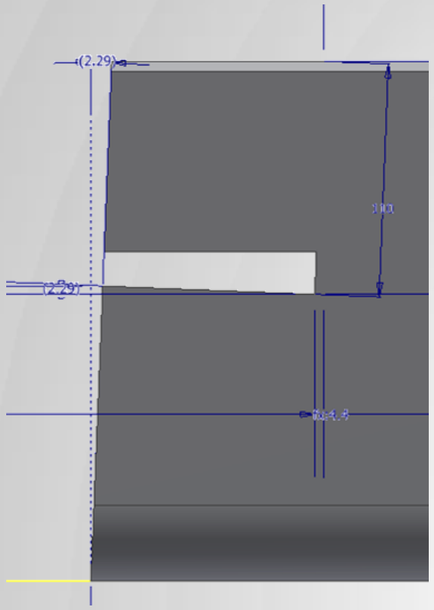
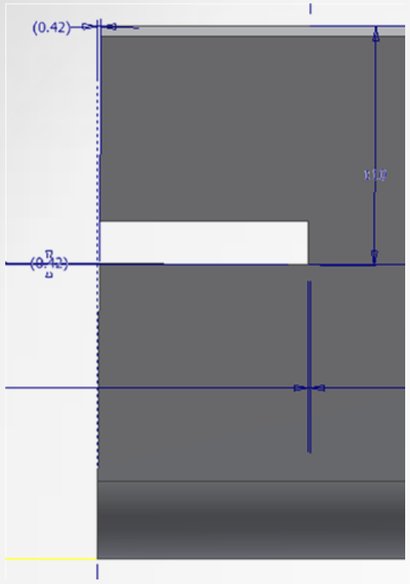
260
110
fx:13
fx:36
fx:26
fx:13
36
fx:26
220
fx:110
fx:358
110
fx:174
fx:167.5
335
fx:26
fx:174
358
fx:110
220

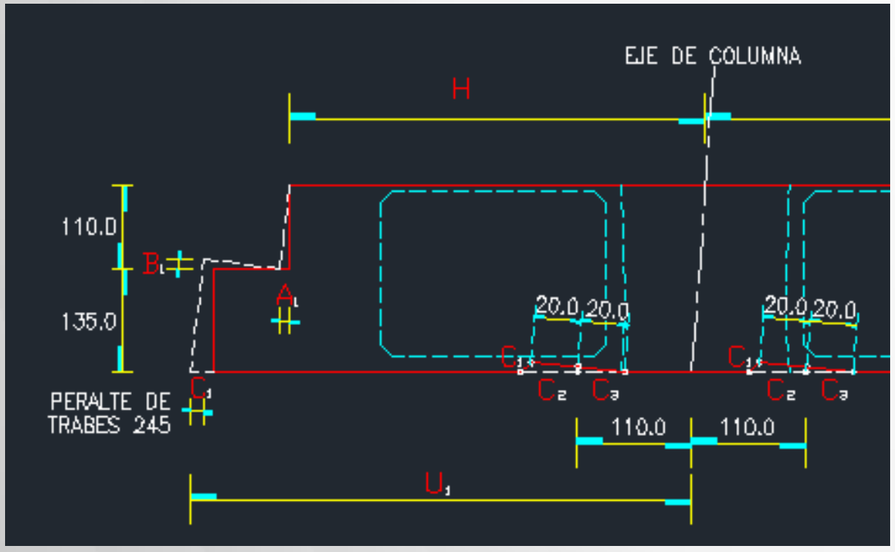

4.05
fx:2.025
fx:2.025
0.2
fx:0.156
2
0.194
0.25
fx:0.075
fx:0.09
fx:0.26
2.09
2.25
0.053
fx:0.075
0.8
fx:0.9
fx:0.26
1.8
fx:1
2
fx:0.9

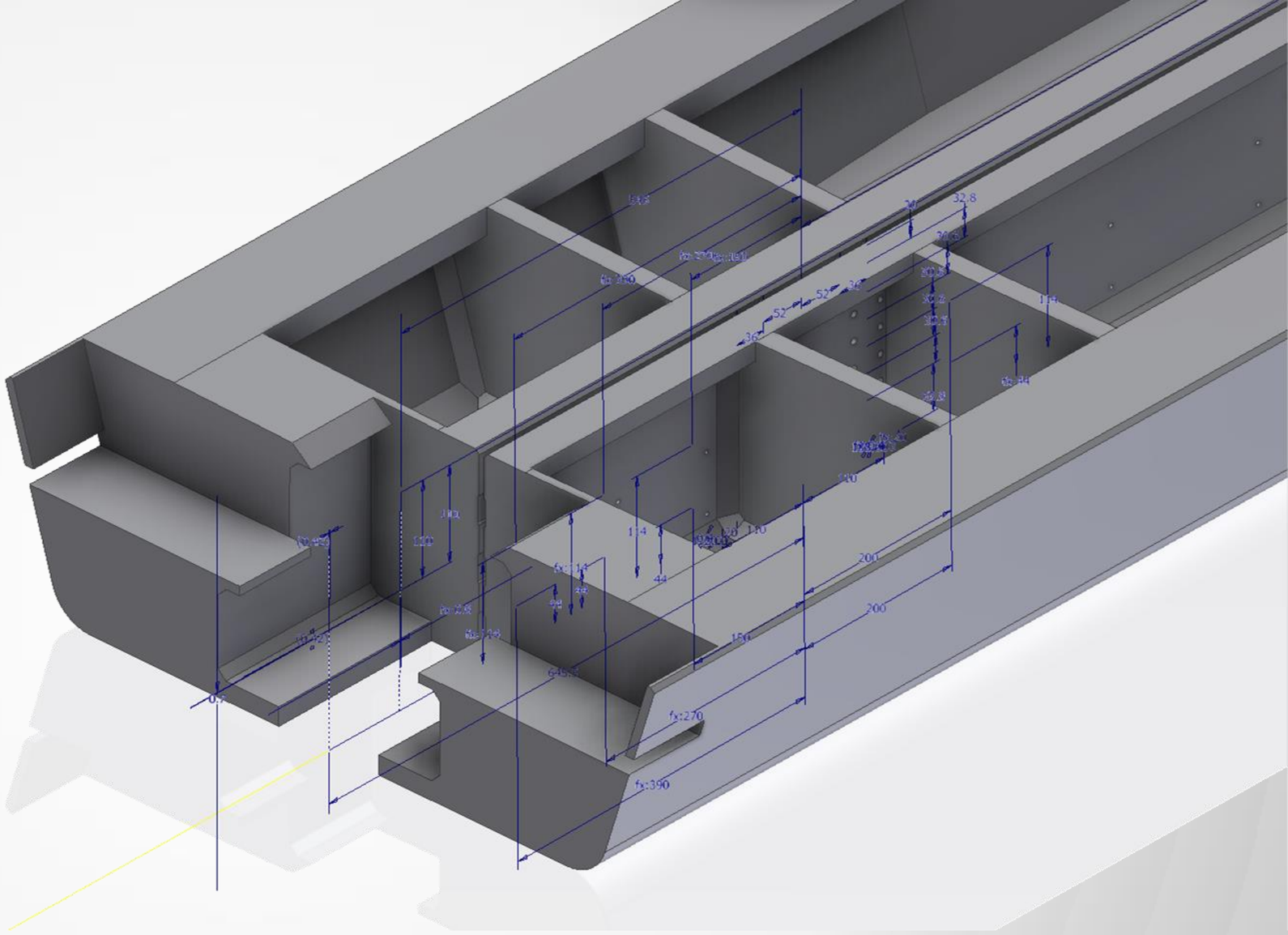

220
fx:110
24
20
21
180
fx:90
80
fx:26
fx:9
fx:28
28
fx:26
fx:80
160
fx:358
80
fx:140
280
fx:26
fx:174
358
fx:80
160


Autodesk Inventor 2015 CAP6C_240X260_V2.ipt
3D Model
Sketch
Inspect
Tools
Manage
View
Environments
BIM
Get Started
Autodesk 360
Start 2D Sketch
Extrude
Revolve
Sweep
Hole
Fillet
Shell
Combine
Direct
Plane
Axis
Point
UCS
Rectangular
Circular
Mirror
Stitch
Patch
Trim
Box
Edit Form
Sketch
Create
Modify
Work Features
Pattern
Surface
Freeform
Model
CAP6C_240X260_V2.ipt
Solid Bodies(2)
Surface Bodies(15)
View: Master
Origin
Sketch1
End of Part
Sketch2
Work Plane1
Sketch3
Work Plane2
Sketch4
Work Plane3
Sketch5
Work Plane4
Sketch6
Work Plane5
Sketch7
Work Point1
Work Plane6
Sketch8
Repaired Geometry1
3D Sketch1
Boundary Patch1
Boundary Patch2
Boundary Patch3
Boundary Patch4
Sketch10
Sketch11
Boundary Patch6
Boundary Patch7
Mirror1
Sculpt1
Mirror2
Extrusion1
Extrusion2
Shell2
Combine1
Extrusion3
Shell1
3100
501
2000
300
fx:108
(3330.812)
2213
1200
My Home
CAP6C_240X260_...ipt
Ready

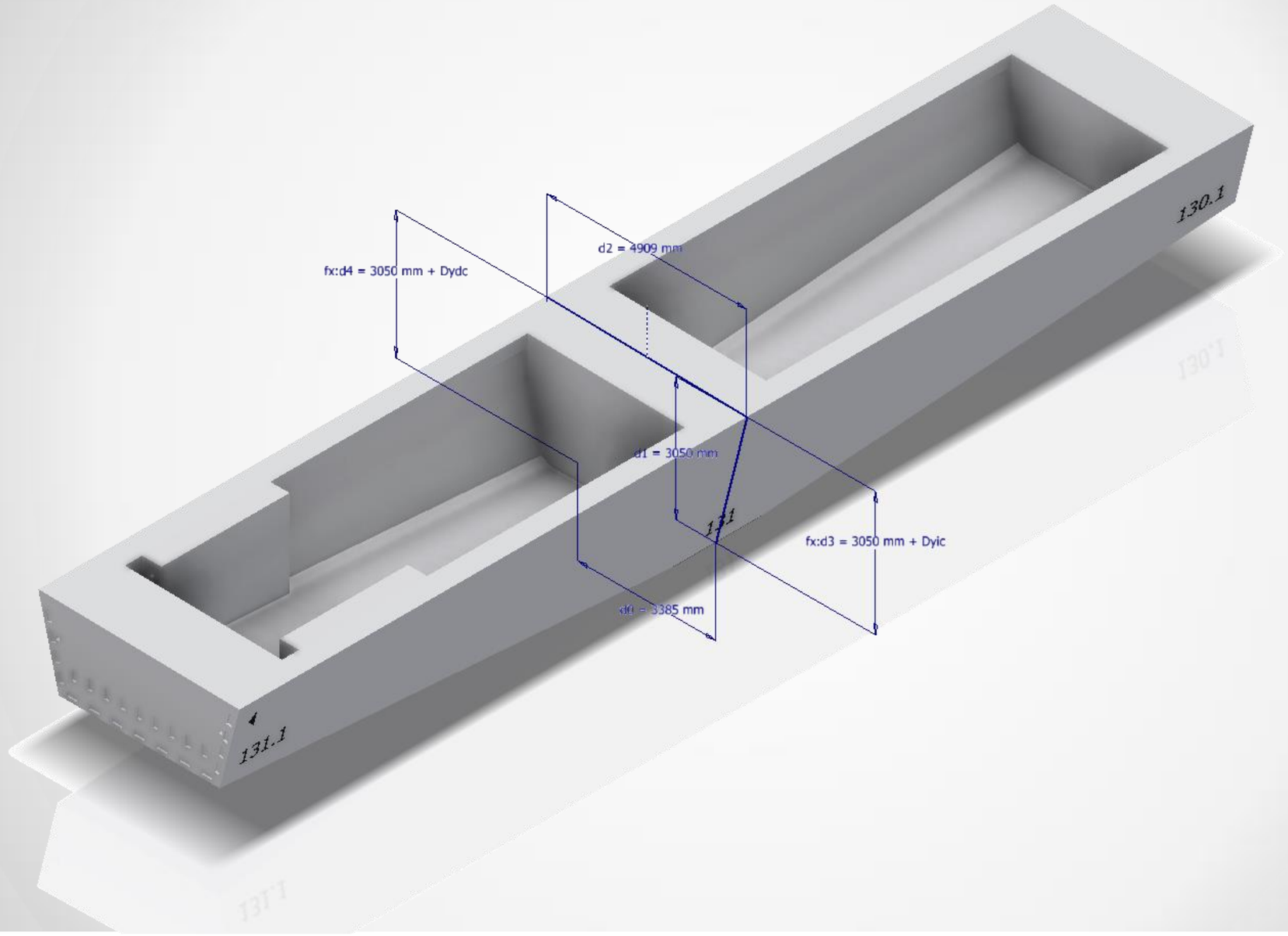


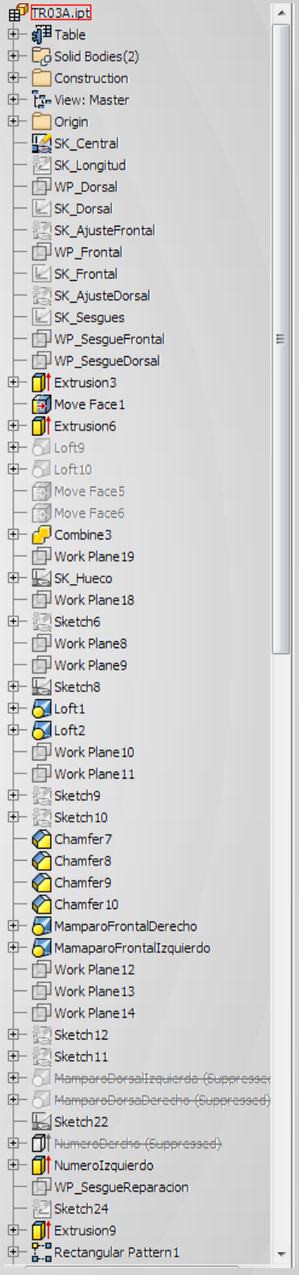



EJE DE COLUMNA
H
110.0
135.0
PERALTE DE
TRABES 245
20.0 20.0
20.0 20.0
110.0
110.0
U1

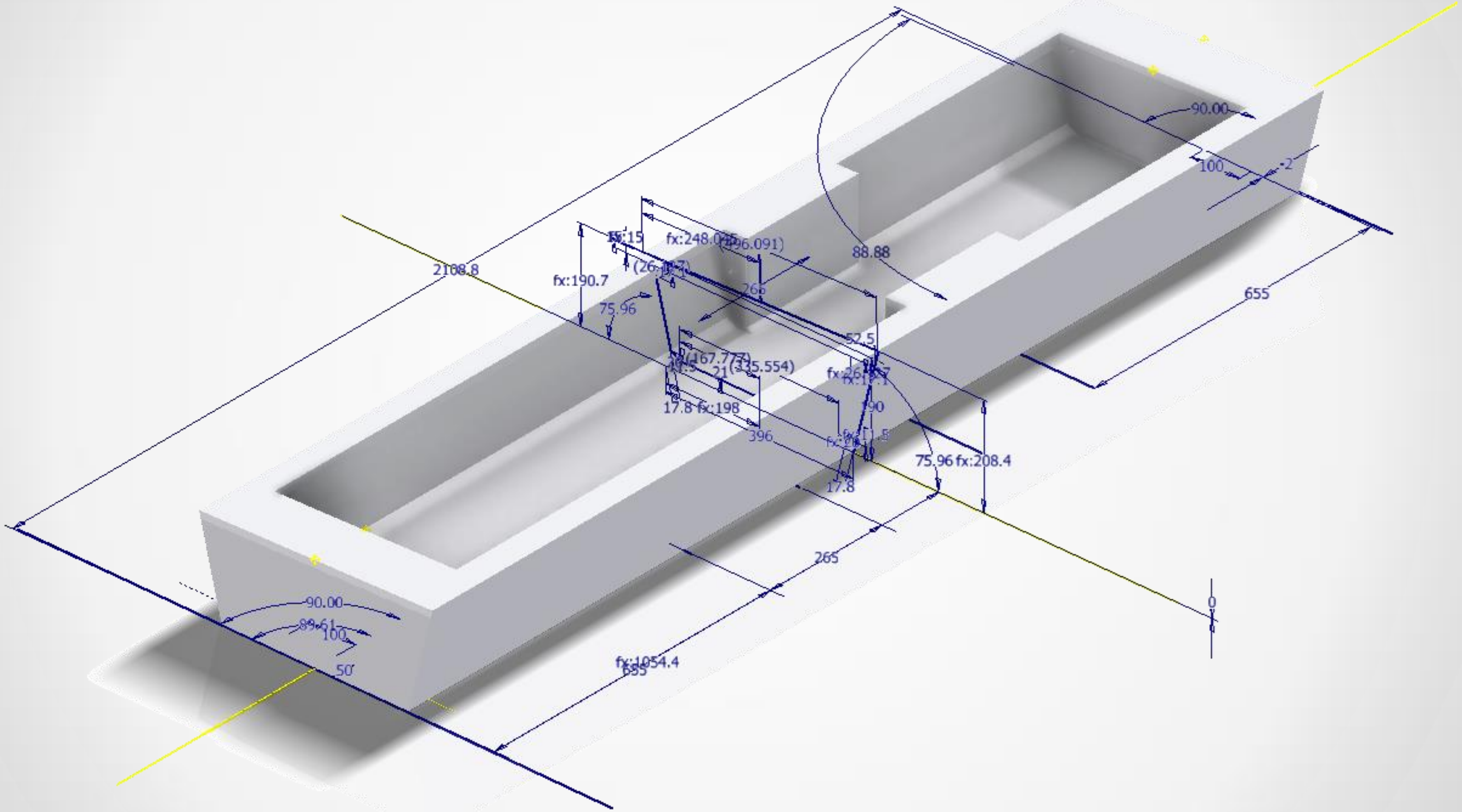


Girder

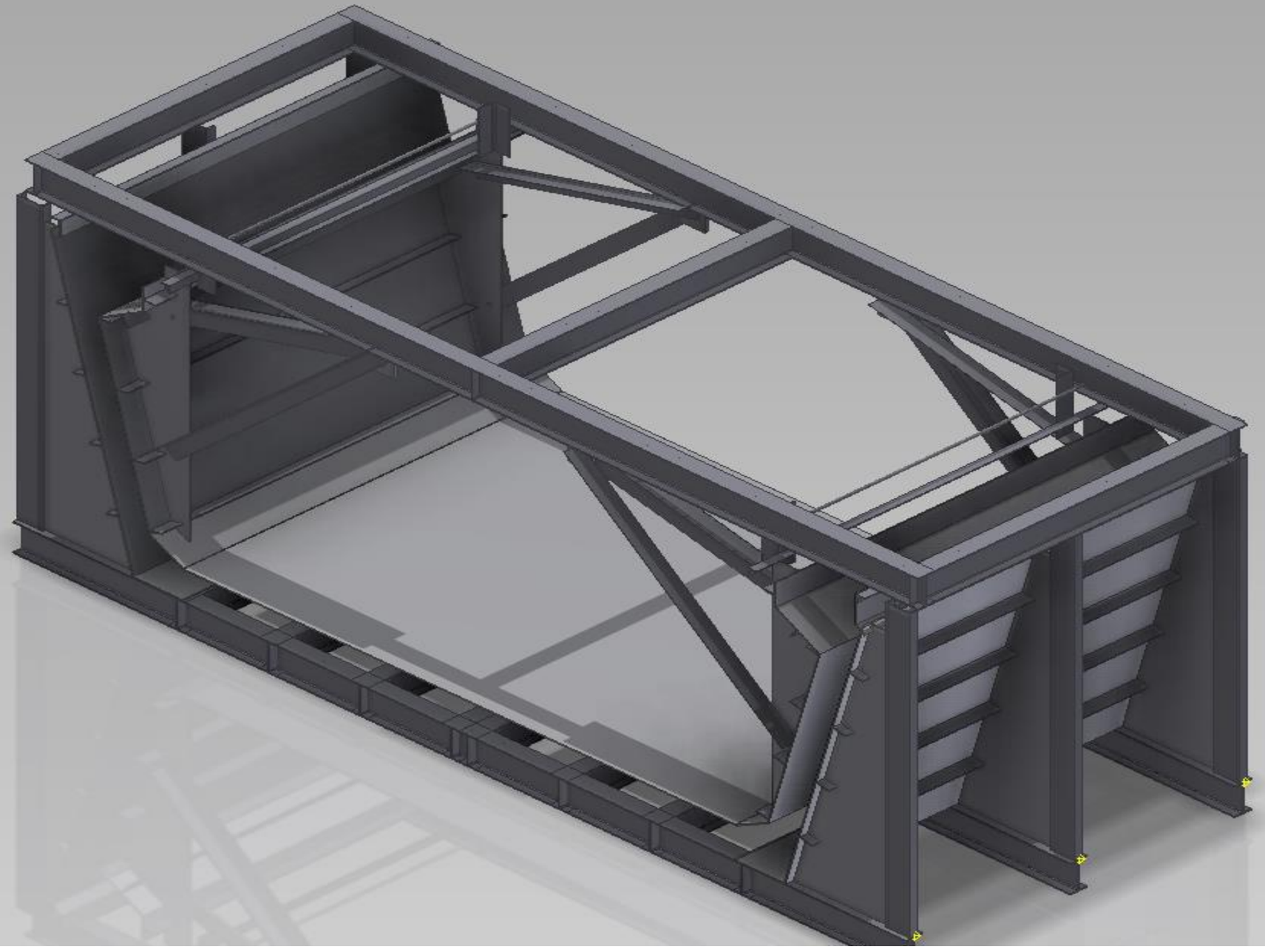

fx:d4 = 3050 mm + Dydc
d2 = 4909 mm
d1 = 3050 mm
fx:d3 = 3050 mm + Dyic
d6 = 3385 mm
130.1
131.1

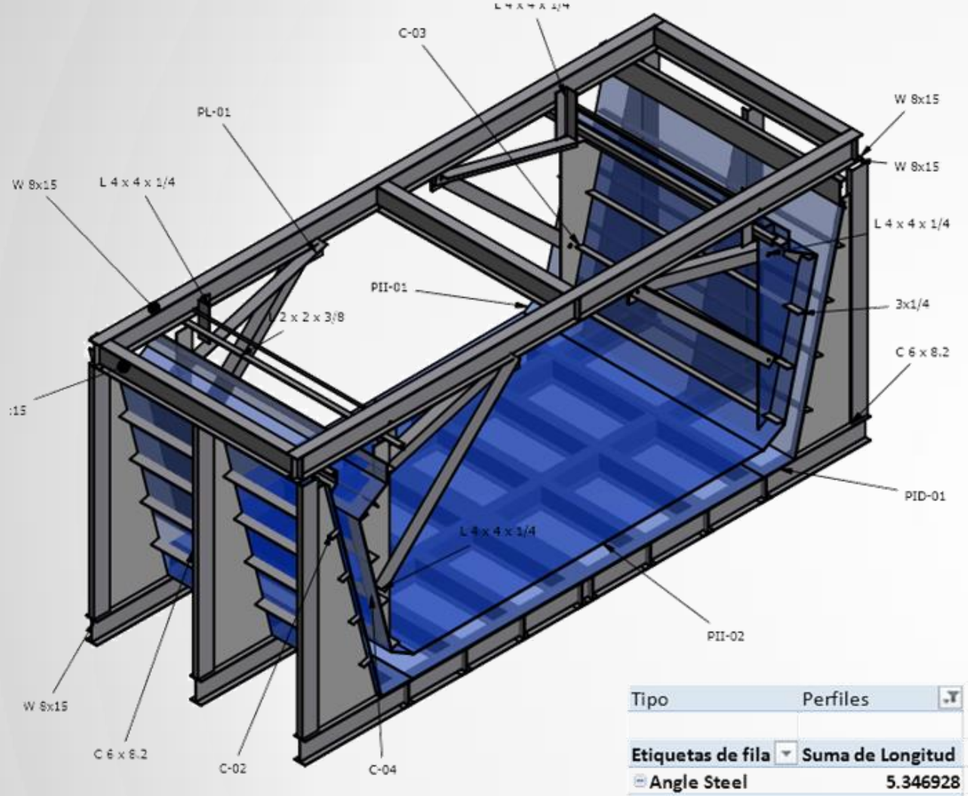

TR03A.ipt
Table
Solid Bodies(2)
Construction
View: Master
Origin
SK_Central
SK_Longitud
WP_Dorsal
SK_Dorsal
SK_AjusteFrontal
WP_Frontal
SK_Frontal
SK_AjusteDorsal
SK_Sesgues
WP_SesgueFrontal
WP_SesgueDorsal
Extrusion3
Move Face1
Extrusion6
Loft9
Loft10
Move Face5
Move Face6
Combine3
Work Plane19
SK_Hueco
Work Plane18
Sketch6
Work Plane8
Work Plane9
Sketch8
Loft1
Loft2
Work Plane10
Work Plane11
Sketch9
Sketch10
Chamfer7
Chamfer8
Chamfer9
Chamfer10
MamparoFrontalDerecho
MamaparoFrontalIzquierdo
Work Plane12
Work Plane13
Work Plane14
Sketch12
Sketch11
MamparoDorsalIzquierdo (Suppressed)
MamparoDorsalDerecho (Suppressed)
Sketch22
NumeroDerecho (Suppressed)
NumeroIzquierdo
WP_SesgueReparacion
Sketch24
Extrusion9
Rectangular Pattern1

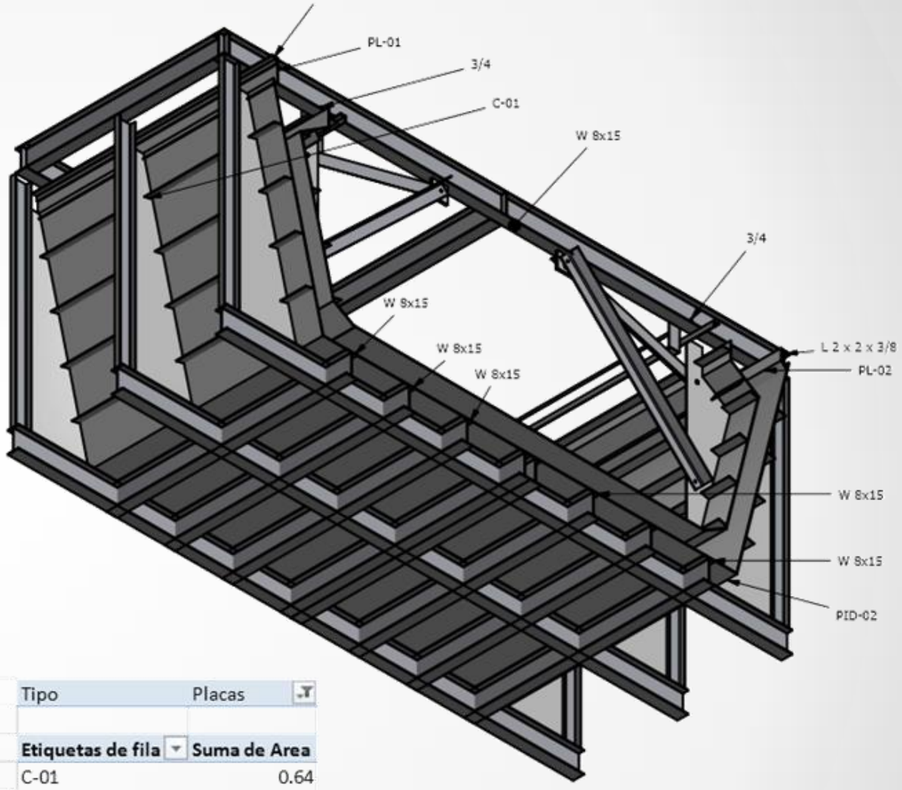
Girder


2108.8
fx:190.7
75.96
88.88
90.00
100
2
655
52.5
396
17.8 fx:198
17.8
75.96 fx:208.4
265
90.00
100
50
0

Formwork Inventor Assemblies

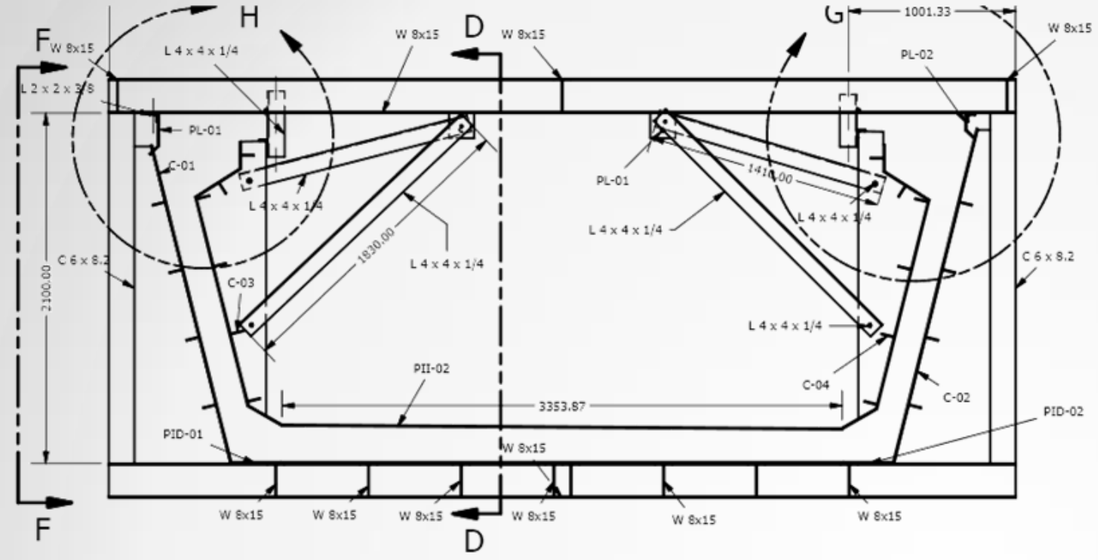


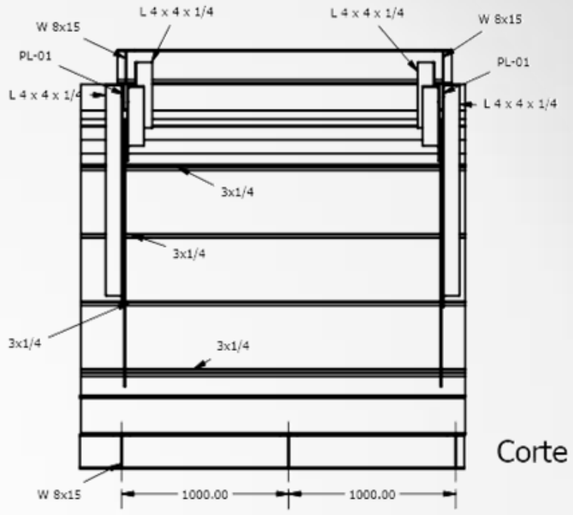




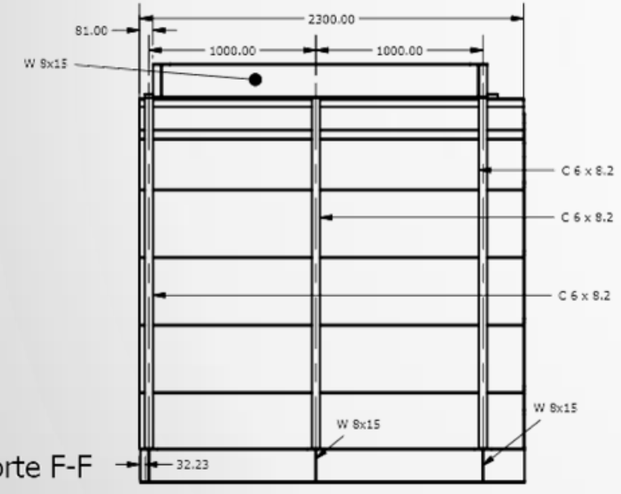
Tipo	Perfiles
Etiquetas de fila	**Suma de Longitud**
Angle Steel	**5.346928**
L 2 x 2 x 3/8	4.781102
L 4 x 4 x 1/4	0.565826
Flat Bar Steel	**1.811024**
3x1/4	1.811024
Round Bars	**3.904242**
3/4	3.904242
U-Shape	**12.6**
C 6 x 8.2	12.6
W Shape	**33.135**
W 8x15	33.135
Total general	**56.797194**

Tipo	Placas
Etiquetas de fila	**Suma de Area**
C-01	0.64
C-02	0.65
C-03	0.4
C-04	0.41
PID-01	5.2
PID-02	5.44
PII-01	4.61
PII-02	7.72
PL-01	0.68
PL-02	0.4
Total general	**26.15**

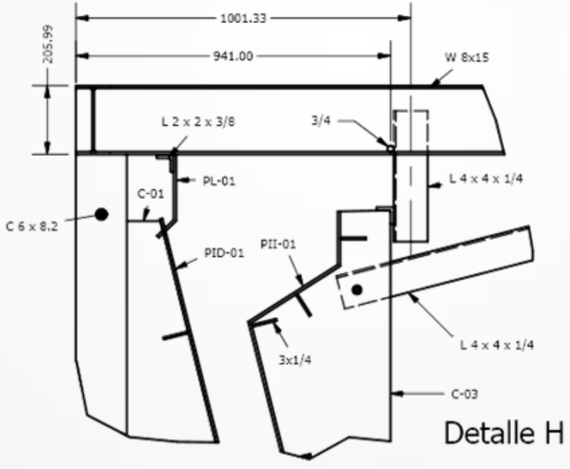




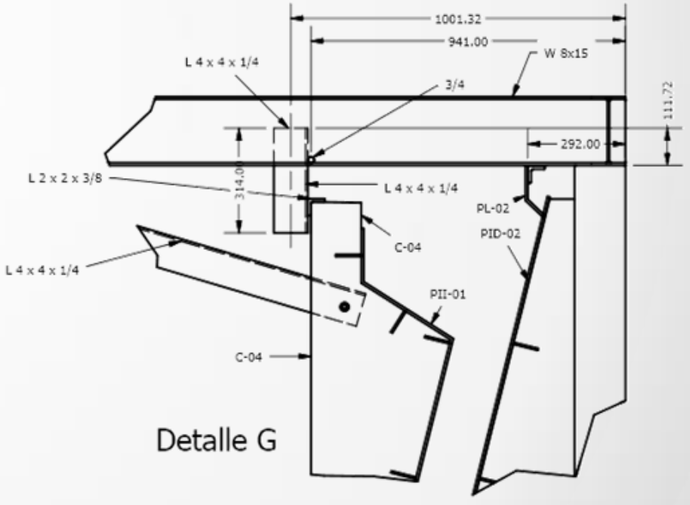
Corte D-D



Corte F-F



Detalle H



Detalle G

PRET

Proyecto:
Rio de los Remedios

No de Pieza
Molde Trabe TC

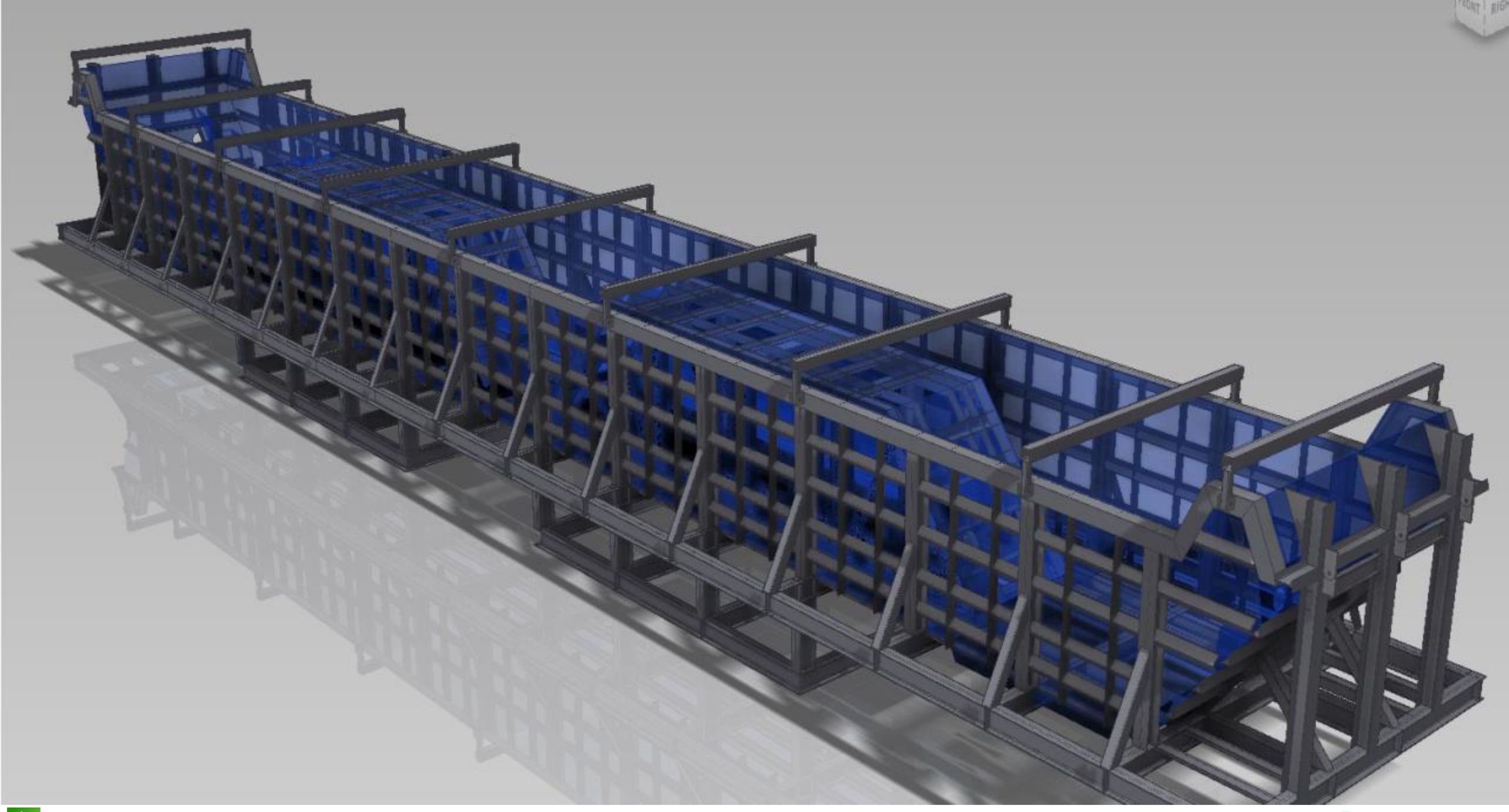
Reporte:
Detalles

Descripción:

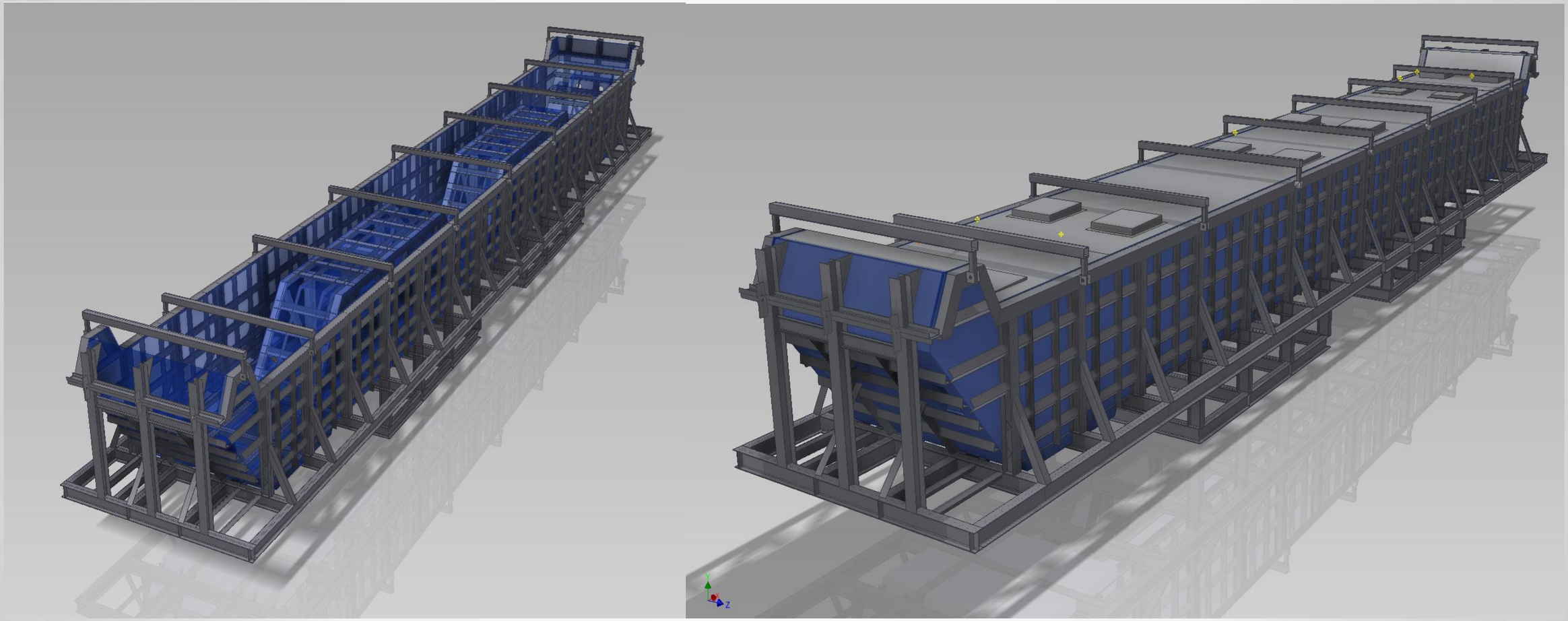
Notas:

ICA BIM no se hace responsable del diseño, esto corre a cuenta del Cliente

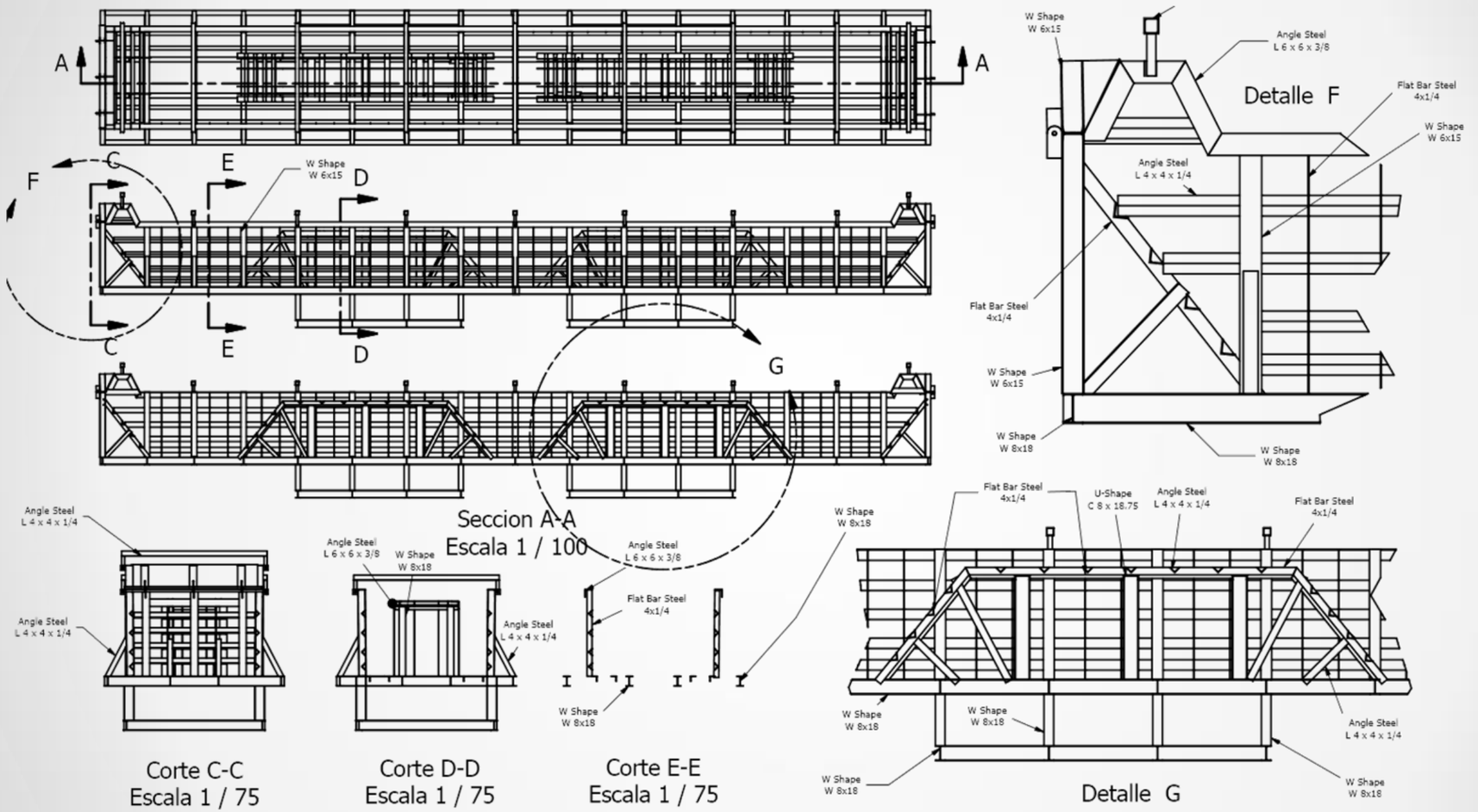
No de Pl
3 d
Fecha de entr
27/05/2
Esc



Column Cap Formwork



Formwork Drawings



PRET

Proyecto:
Rio de los Remedios

No de Pieza

Reporte:
Cortes - Molde

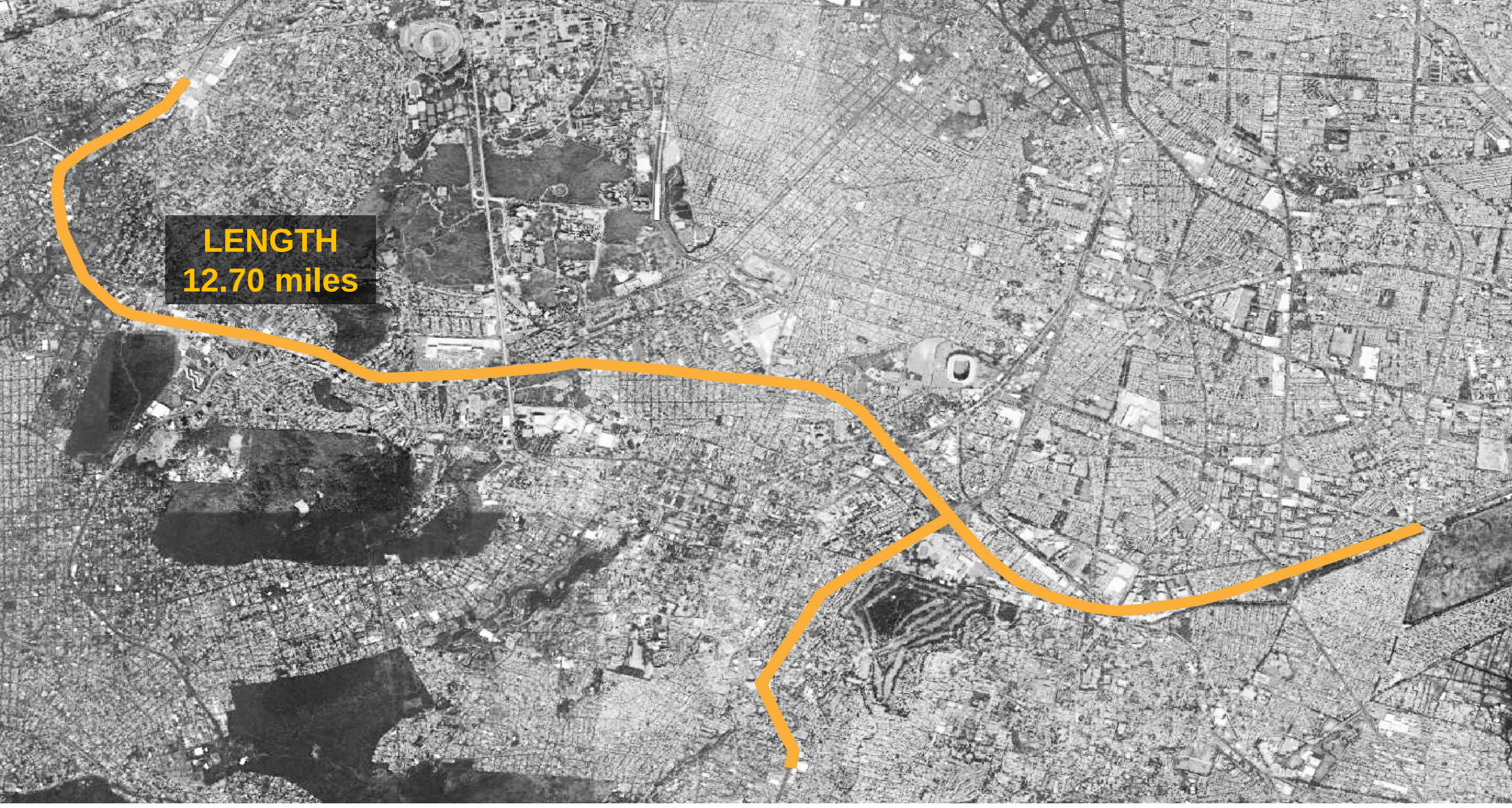
Descripción:

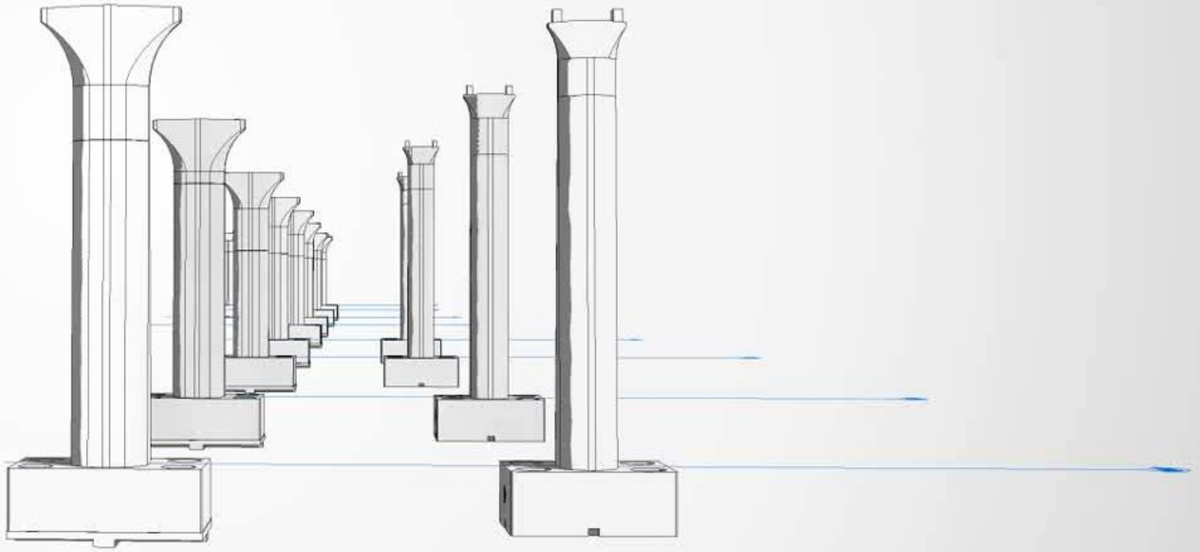
Notas:

ICA BIM no se hace responsable del diseño, esto corre a cuenta del Cliente

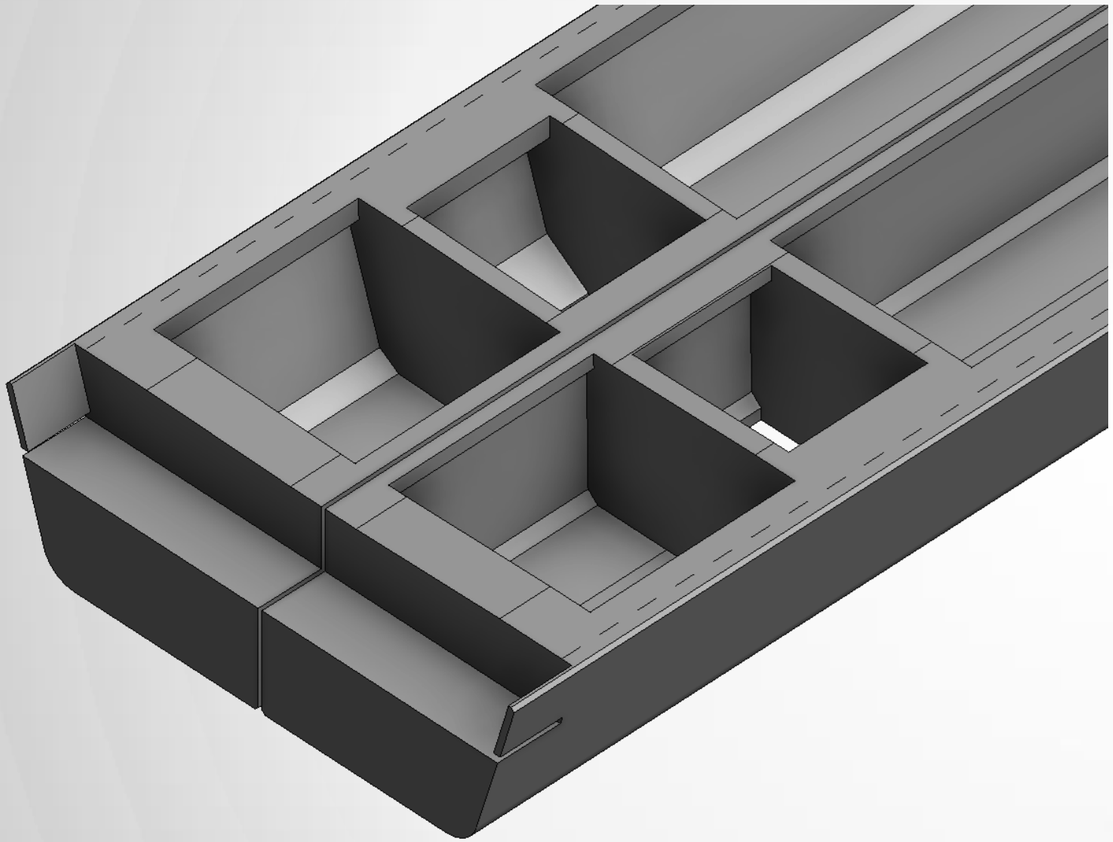
No de Plar
2 de
Fecha de entreg

Assembly Models in Revit


LENGTH
12.70 miles

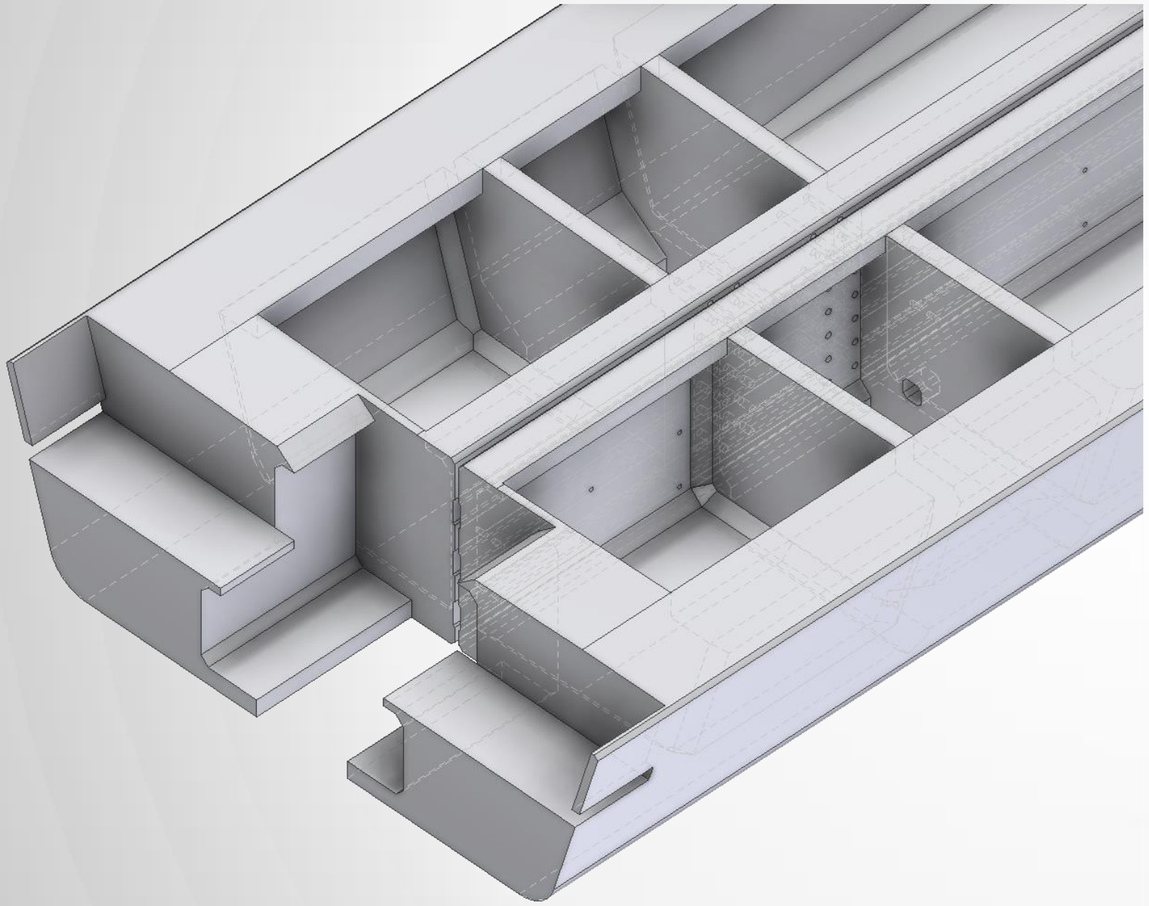


Assembly Model in Revit



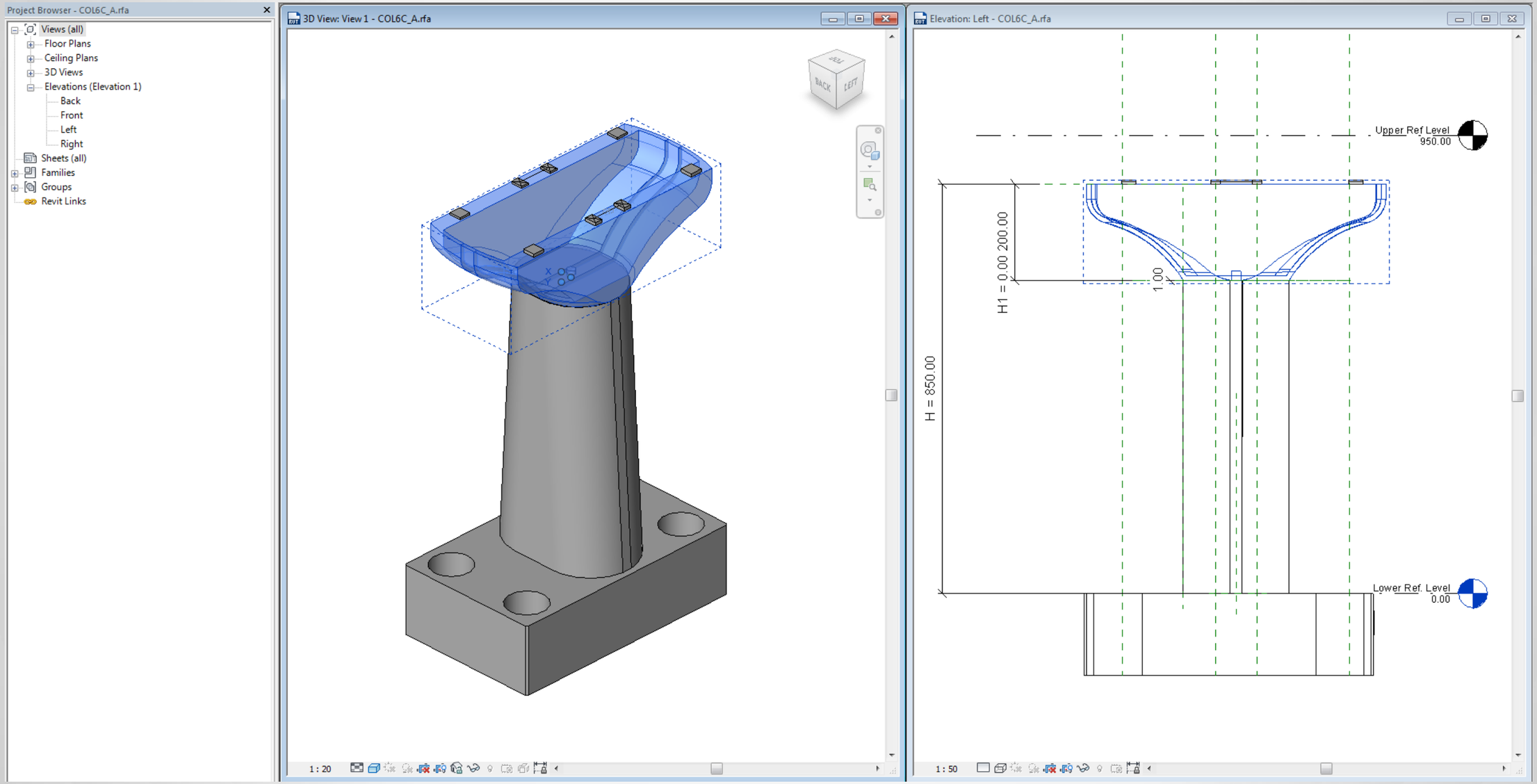
- Quantity Takeoff for elements made in-situ
- Incongruence, intersections and geometry relationships.
- Progress Report
- Simulation 4D.
- MEP Models.

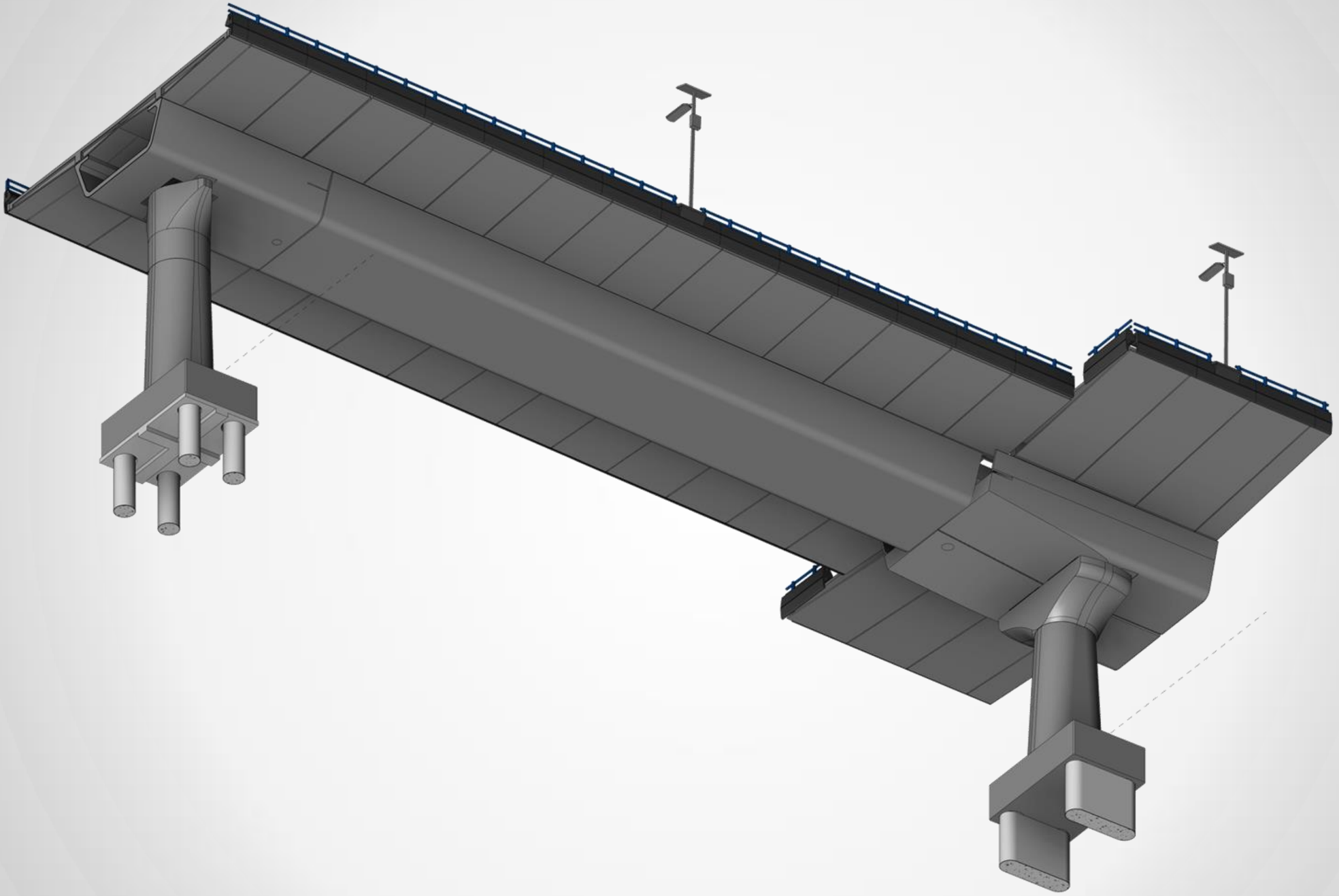
Geometry Model in Inventor and Rebar Model in Revit

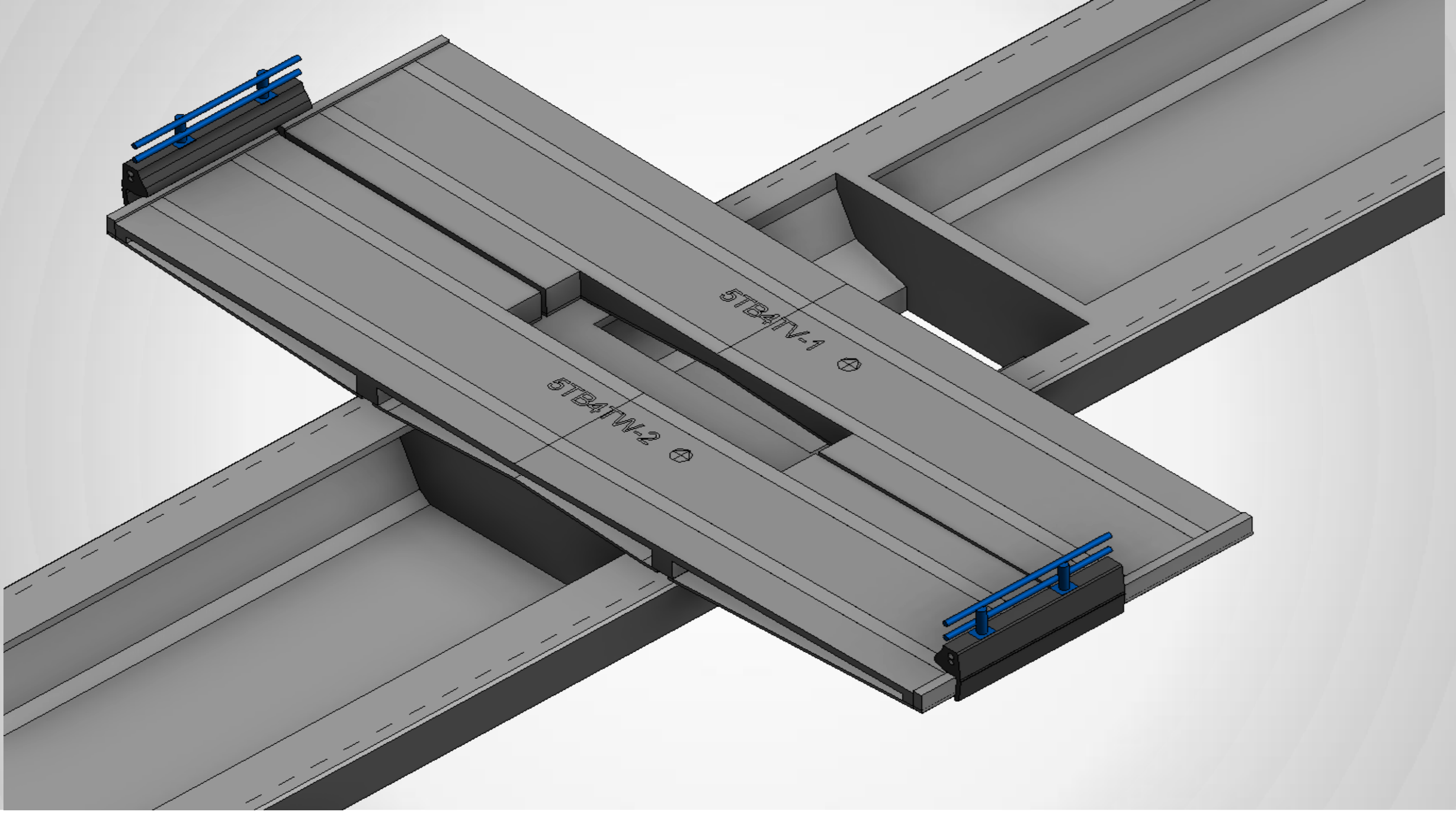


- Comparison among many elements for Formwork Optimization
- Rebar and concrete Quantity Takeoff
- Clash detection
- Shop drawings – Rebar and Tendons

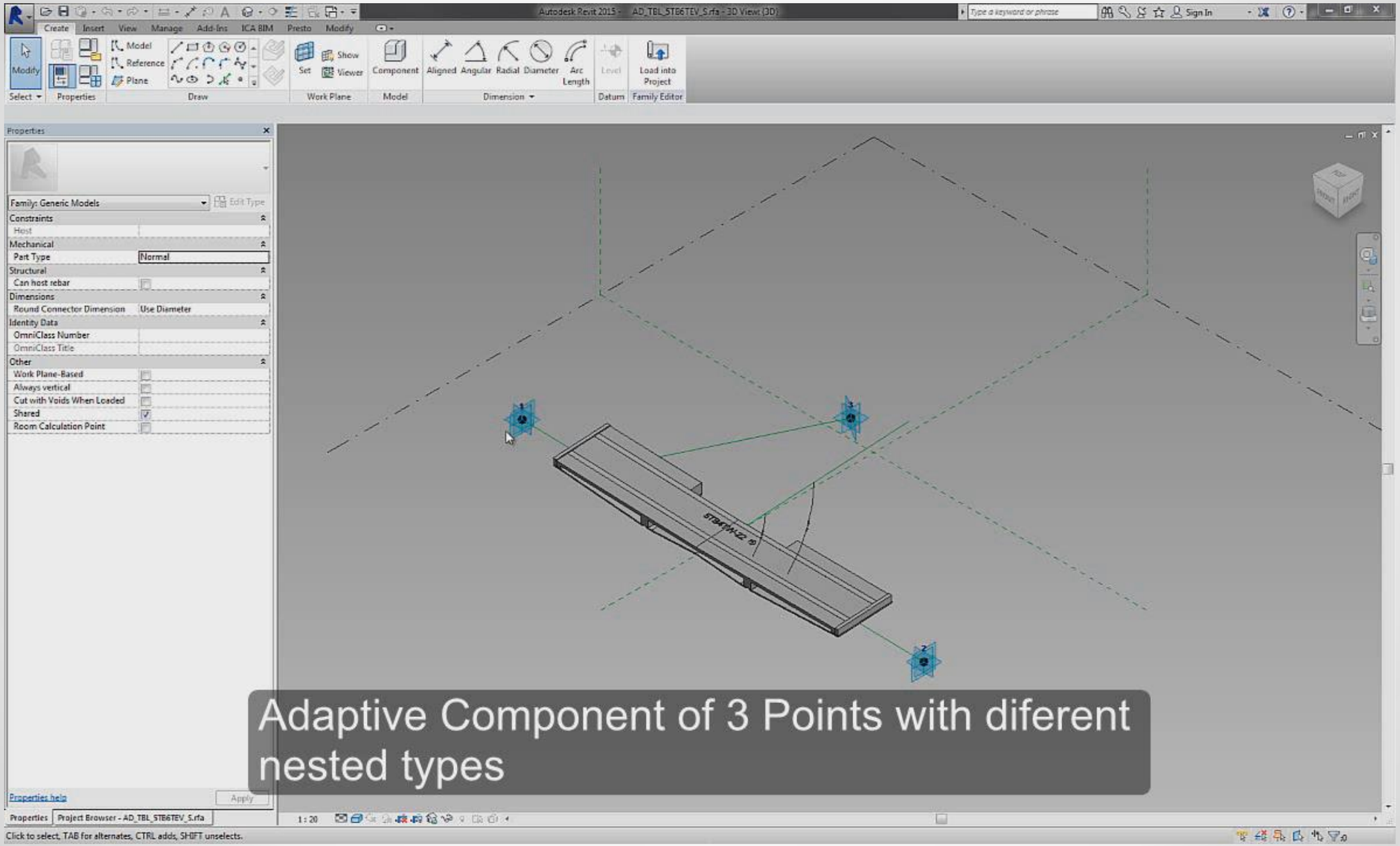
Assembly Family Column



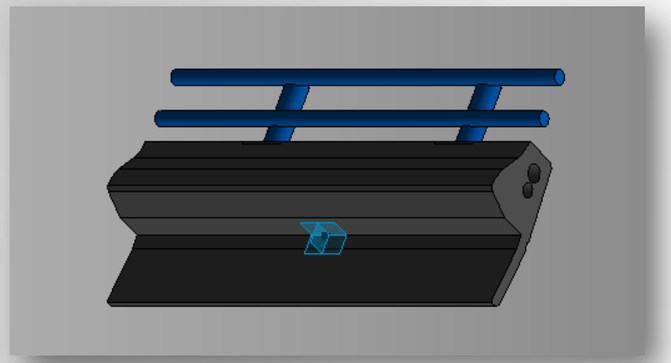


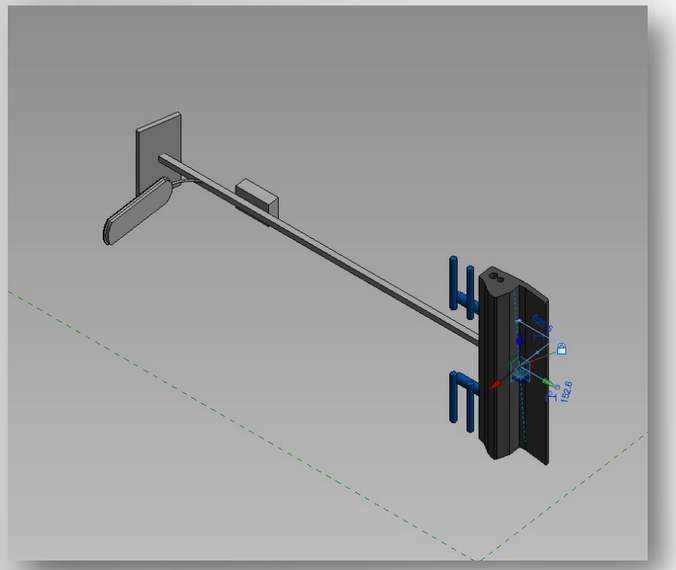

5TB4TW-1
5TB4TW-2

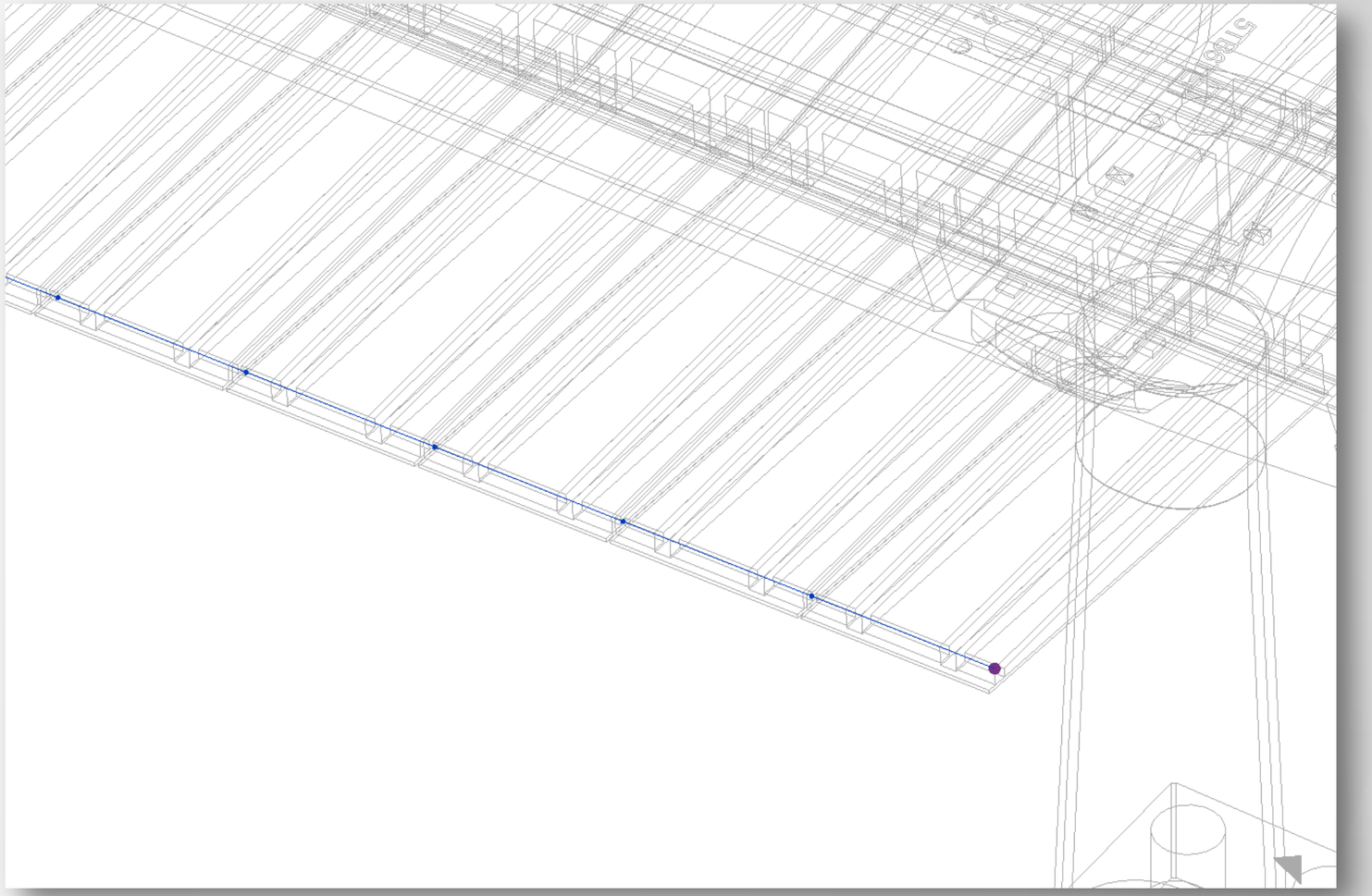
Link Prefab Slabs to Excel



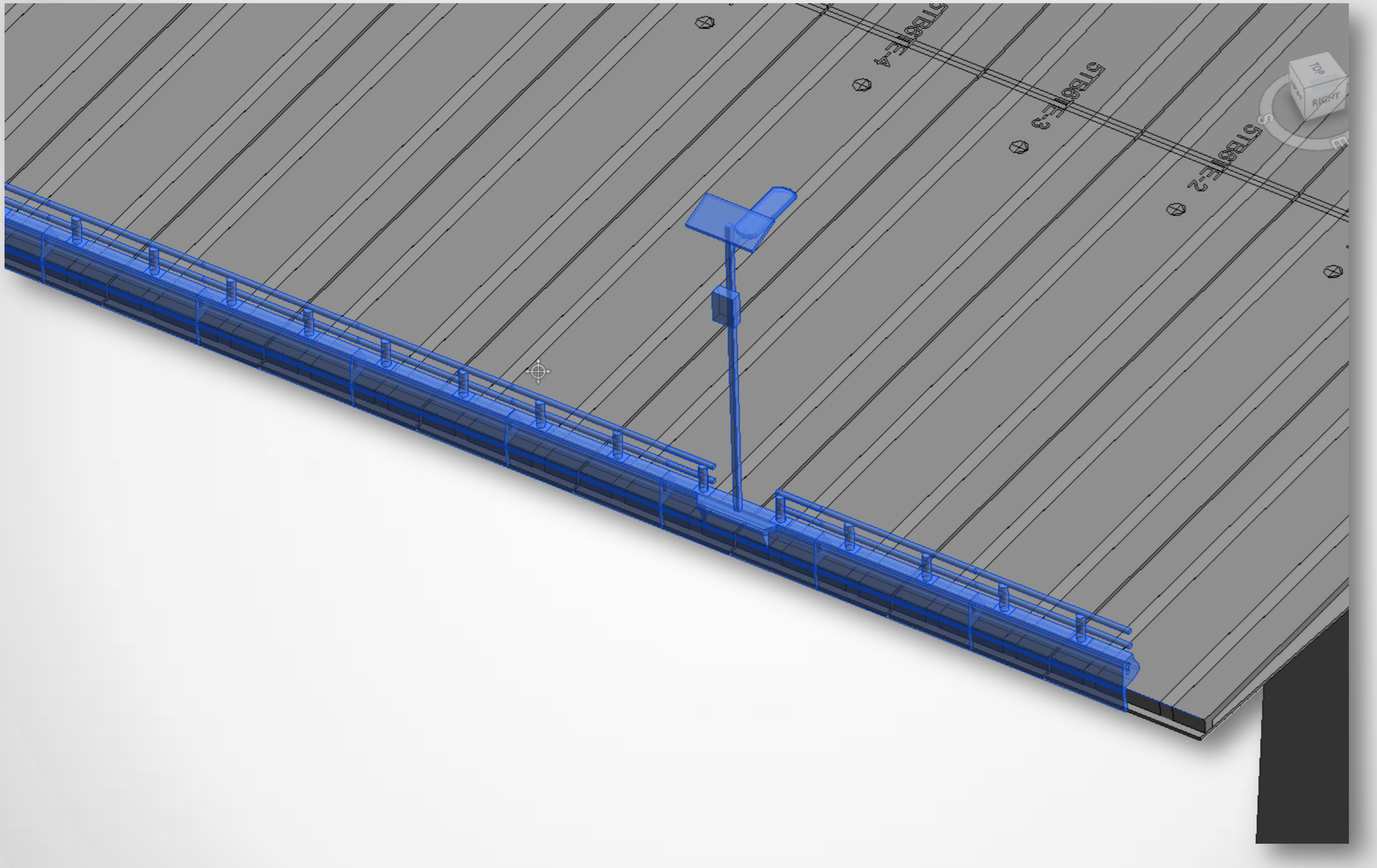
Railing Families and a Division Path





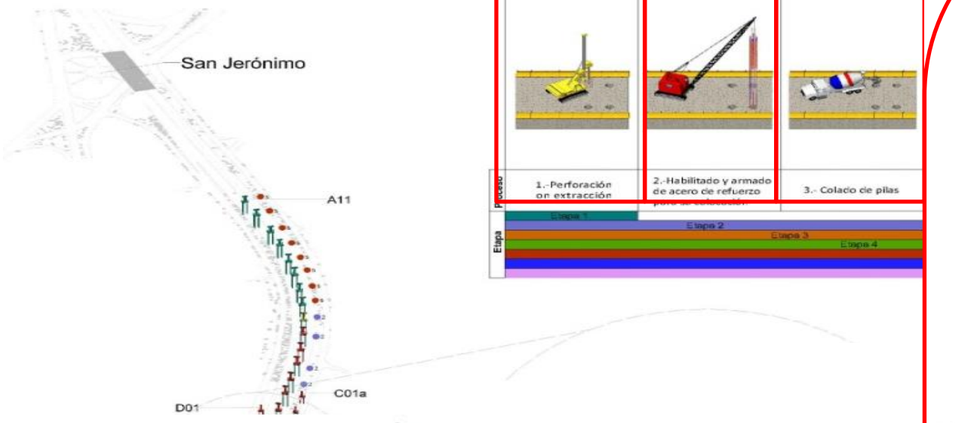


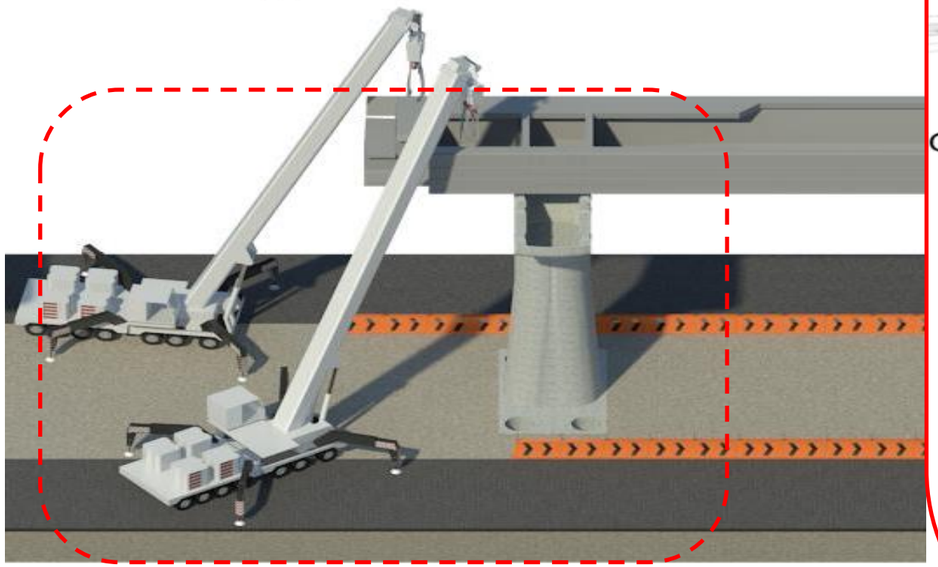
Railing Families and a Division Path

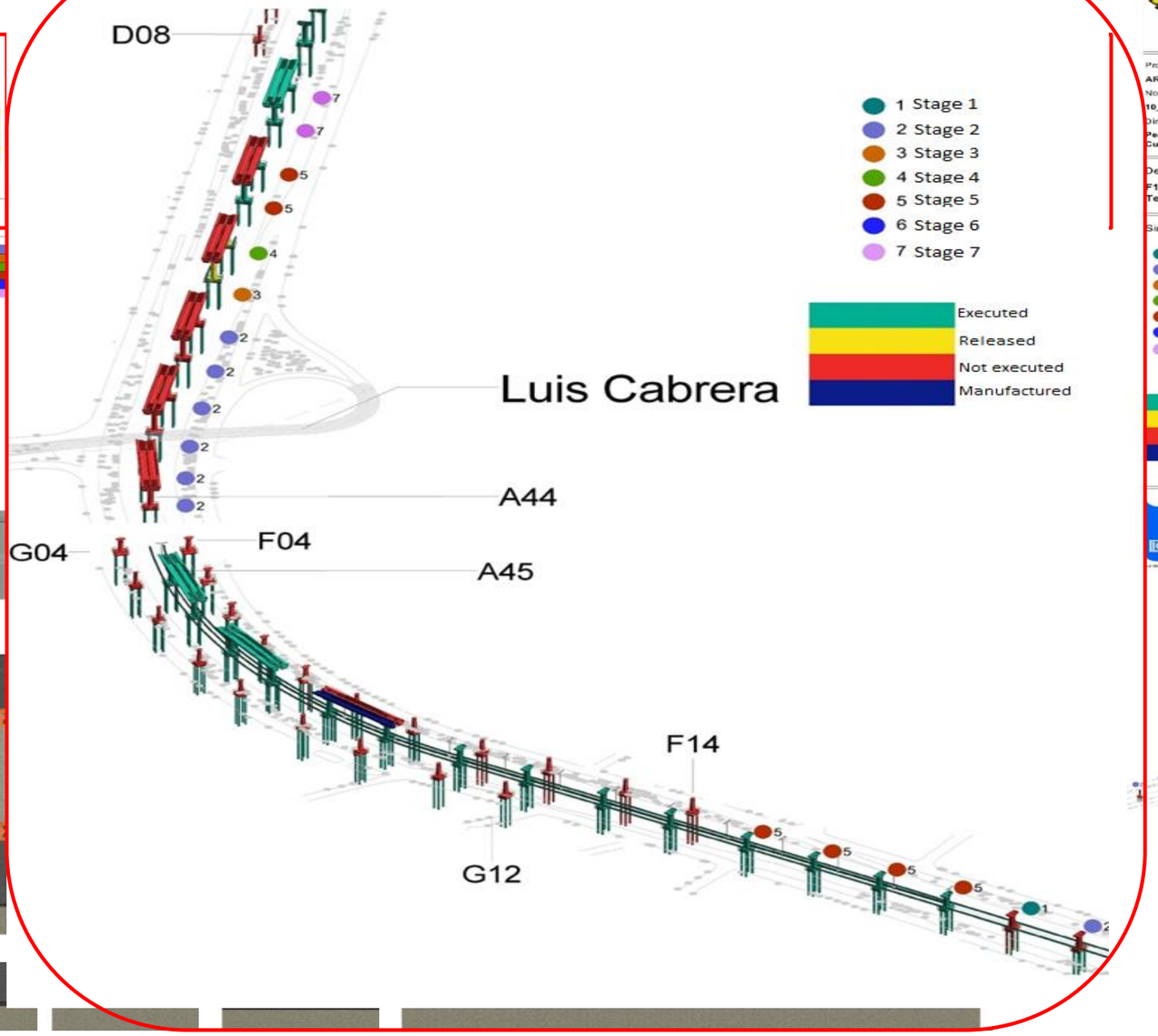


F1_T1-T3_San Jerónimo-Luis Cabrera-Camino Sta. Teresa-Picacho Ajusco

construction process







autopistaurbana sur

Ciudad México

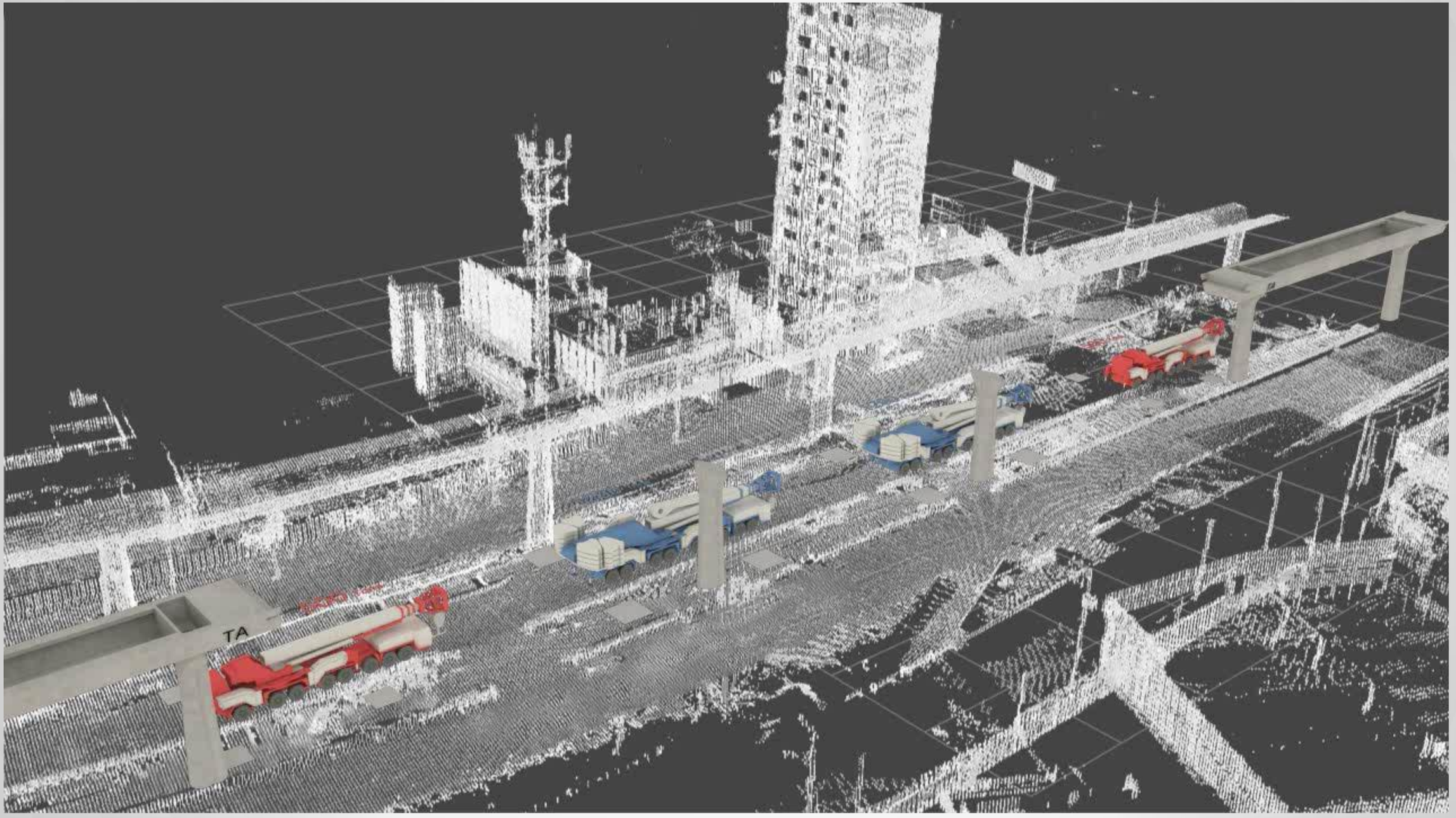
Proyecto:
ARCO SUR
No. de Proyecto:
10_009
Dirección:
Periferico Sur, San Jerónimo-Muyuguarda-Caseta a Cuernavaca.
Descripción:
F1_T1-T3_San Jerónimo-Luis Cabrera-Camino Sta. Teresa-Picacho Ajusco
Simbología:
1 Etapa 1
2 Etapa 2
3 Etapa 3
4 Etapa 4
5 Etapa 5
6 Etapa 6
7 Etapa 7
Ejecutado
Liberado
No ejecutado
Fabricado

ICA bim
ICA construcciónurbana

San Jerónimo

Secuencia de Montaje

VIADUCTO TLALPAN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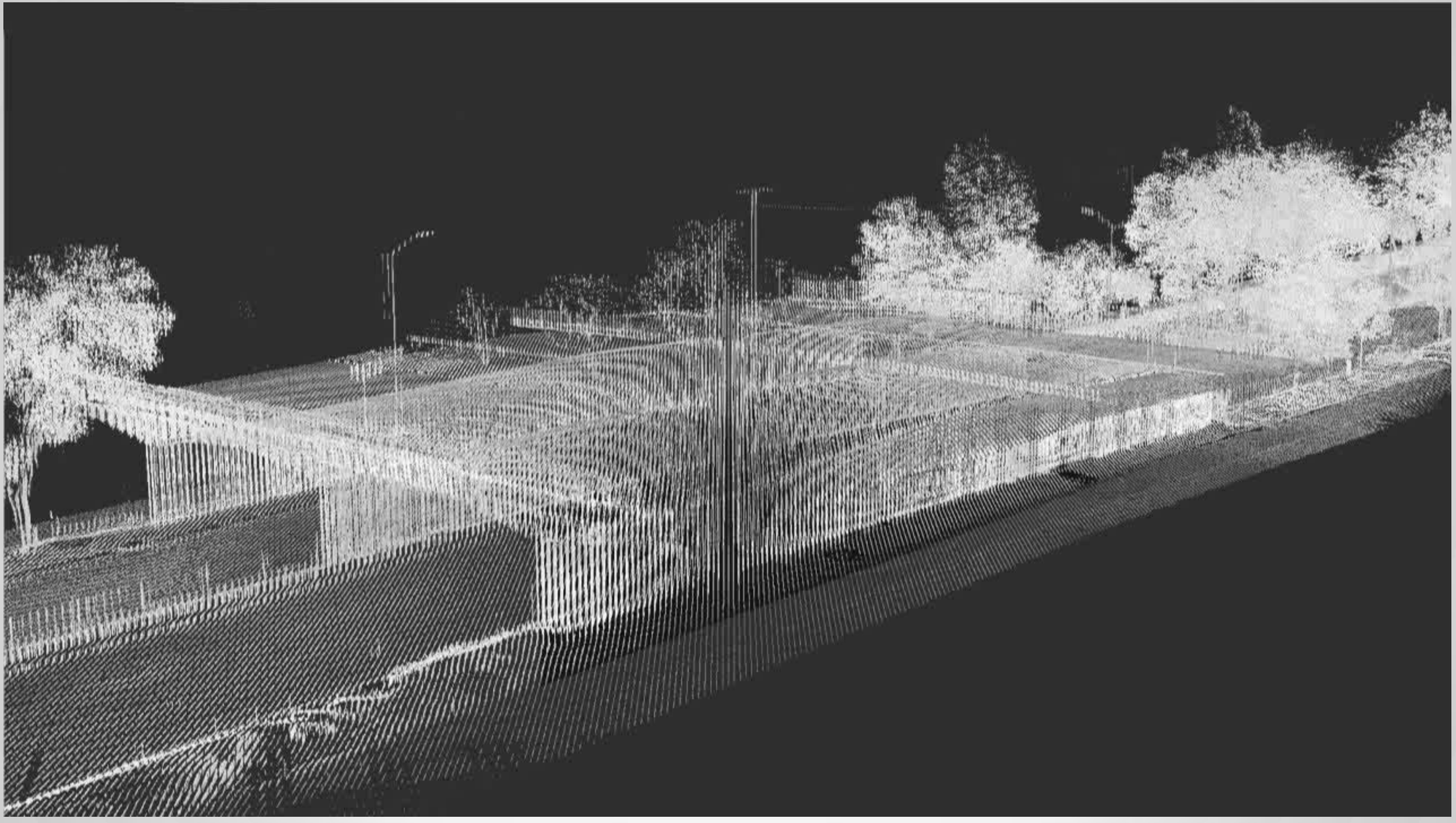

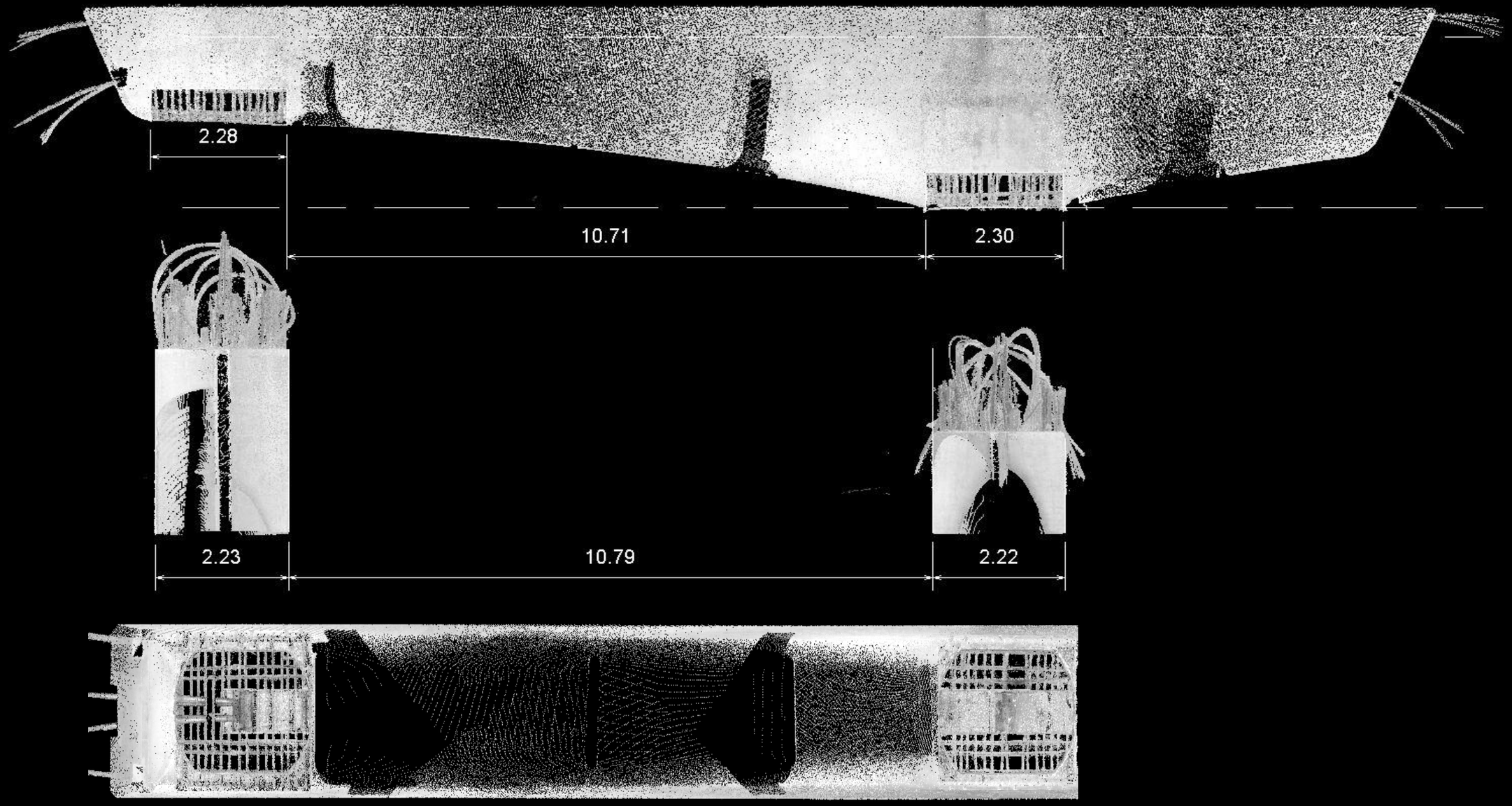
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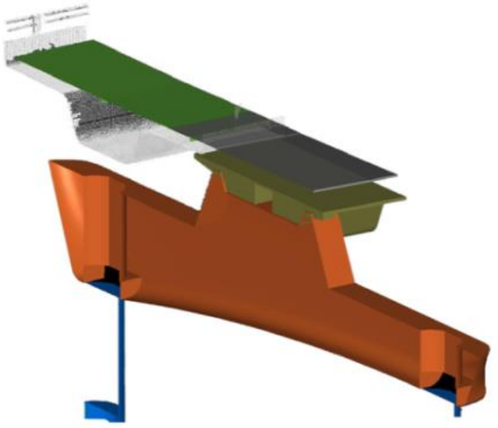
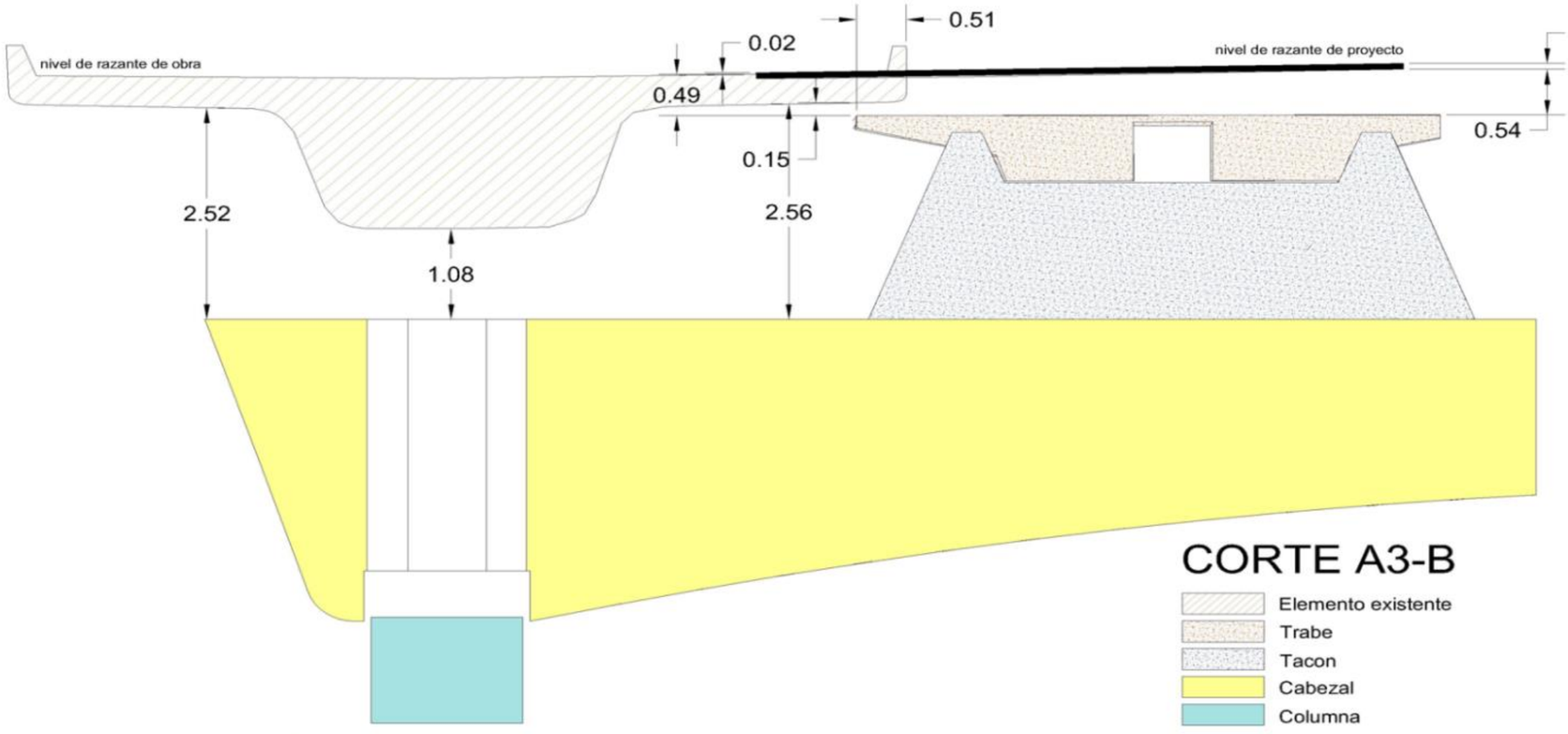
10.79
2.22



VISTA 3D



CORTE A3-B

- Elemento existente
- Trabe
- Tacon
- Cabezal
- Columna

Ciudad México

autopistaurbana sur

Proyecto: Arco Sur

No. de Proyecto:

REPORTE

ENTRONQUE SAN JERONIMO

Descripción:

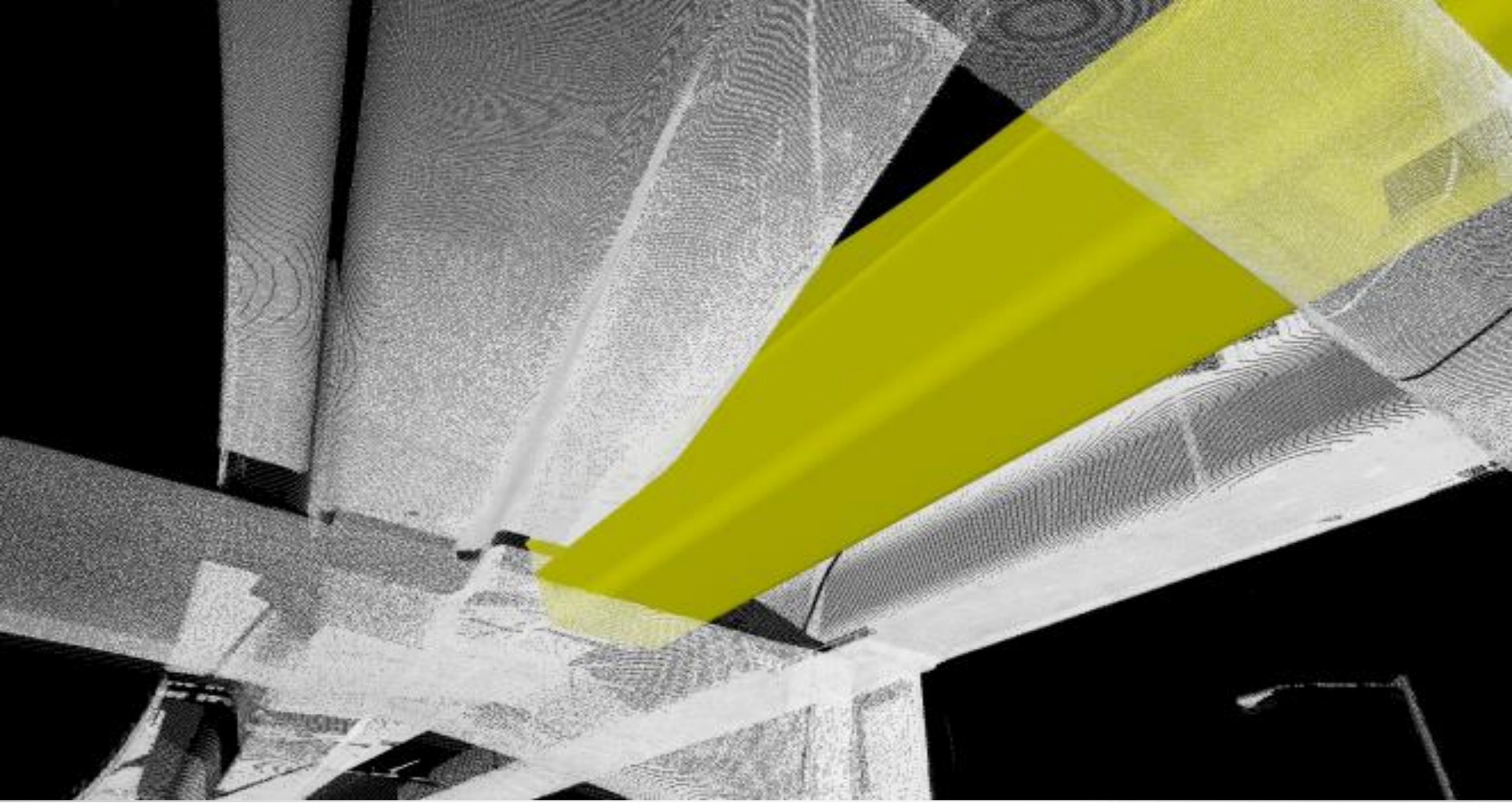
San Jerónimo

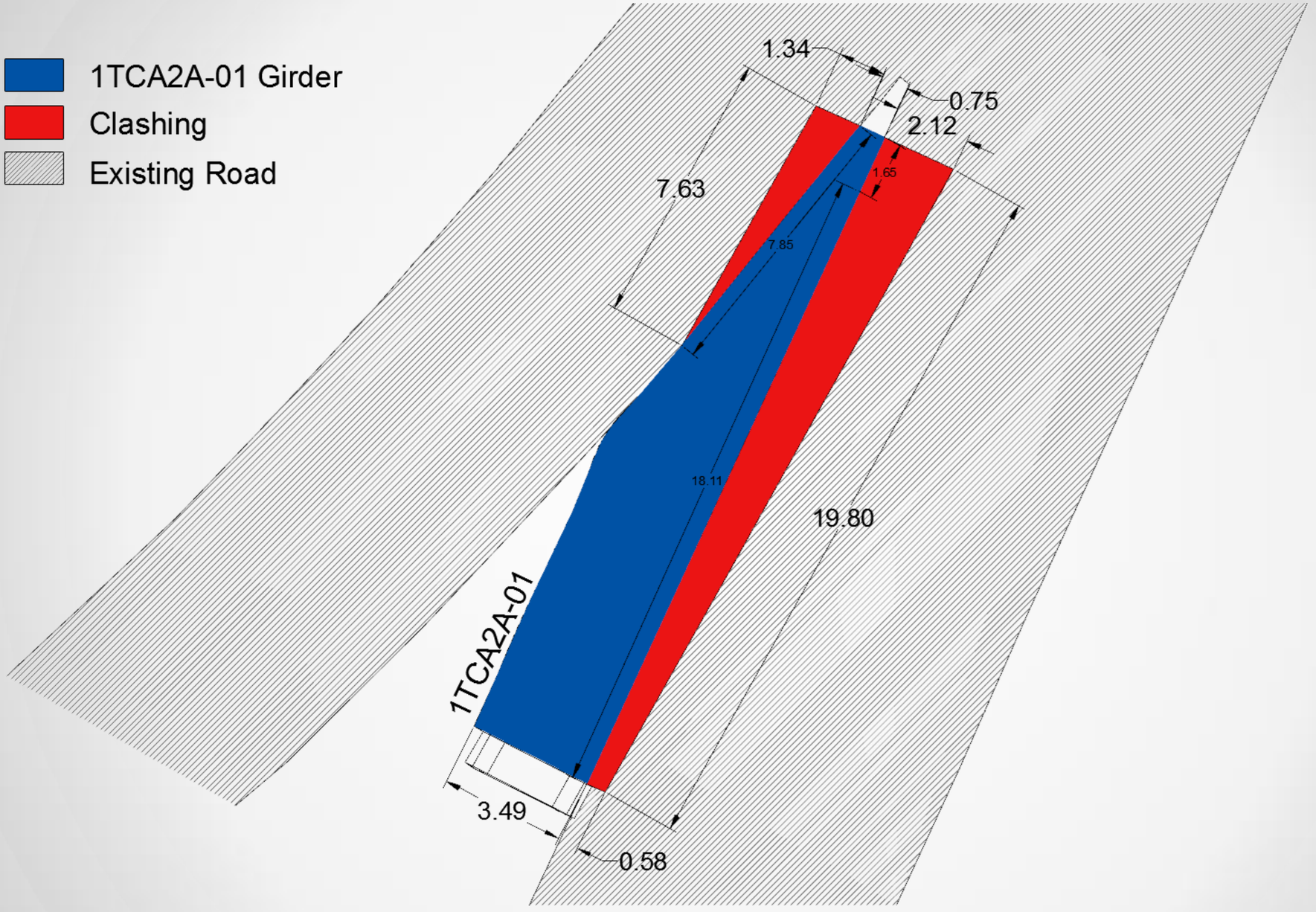
Clave: B3

Fecha de entrega: 28/03/12

escala:

ICA bim ICA construcciónurbana




1TCA2A-01 Girder
Clashing
Existing Road
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2.12
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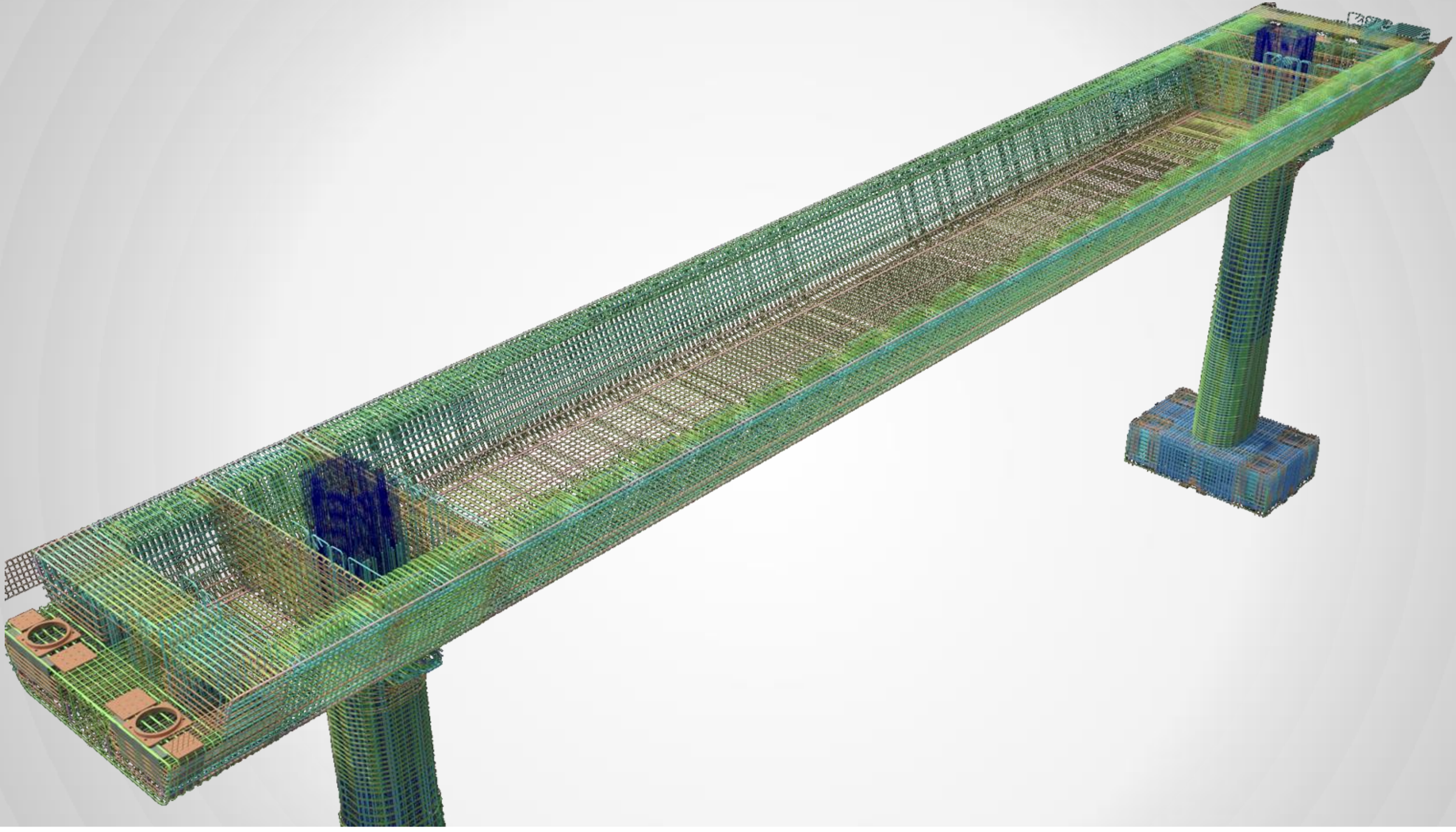
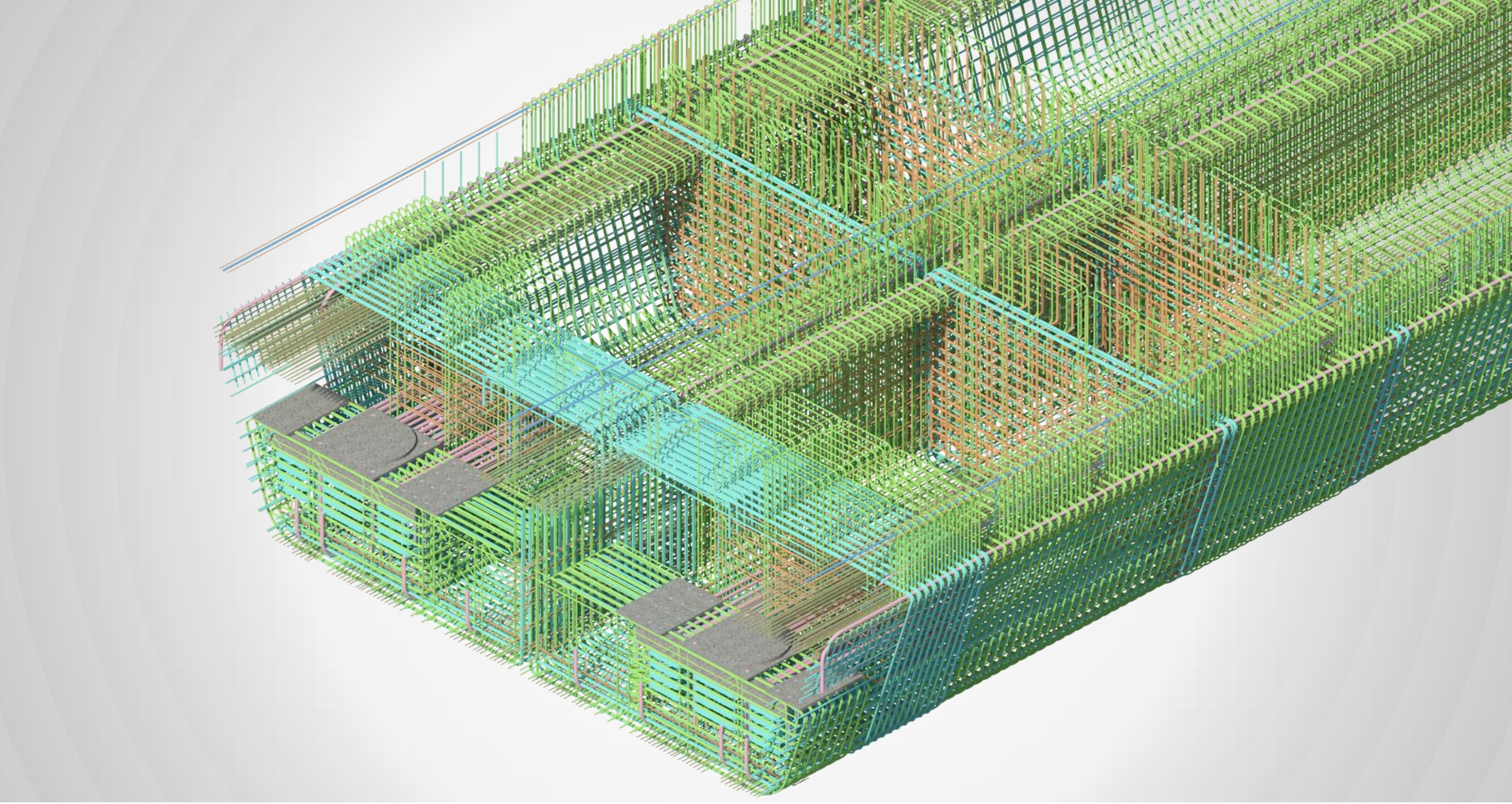
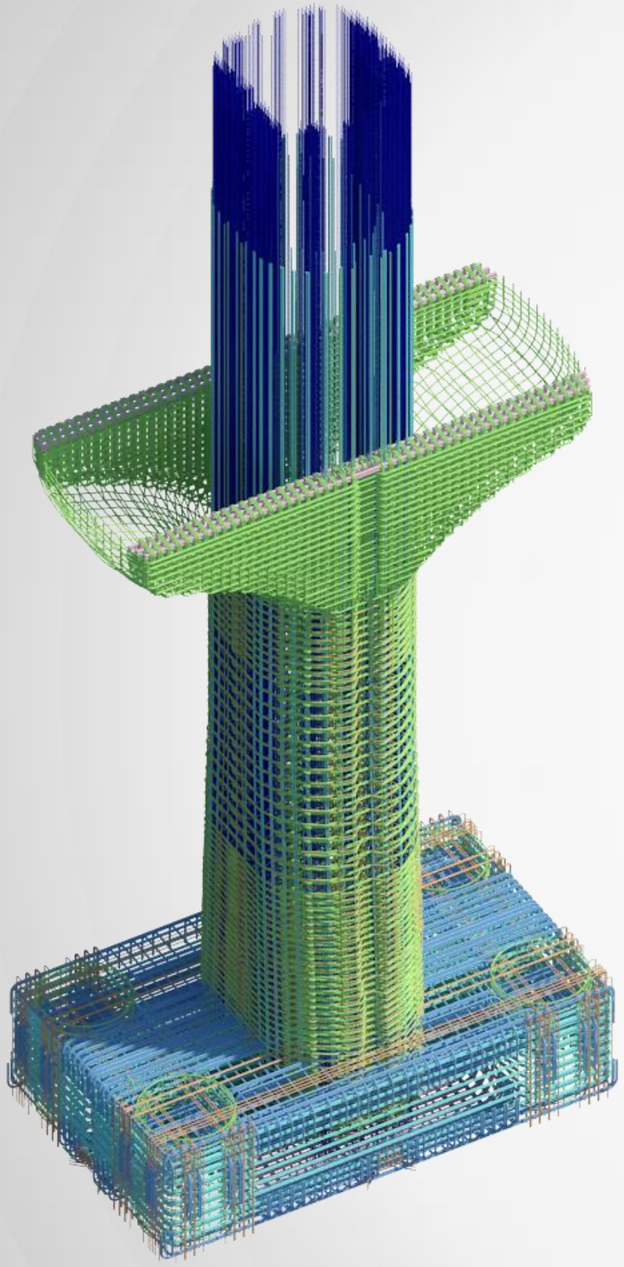
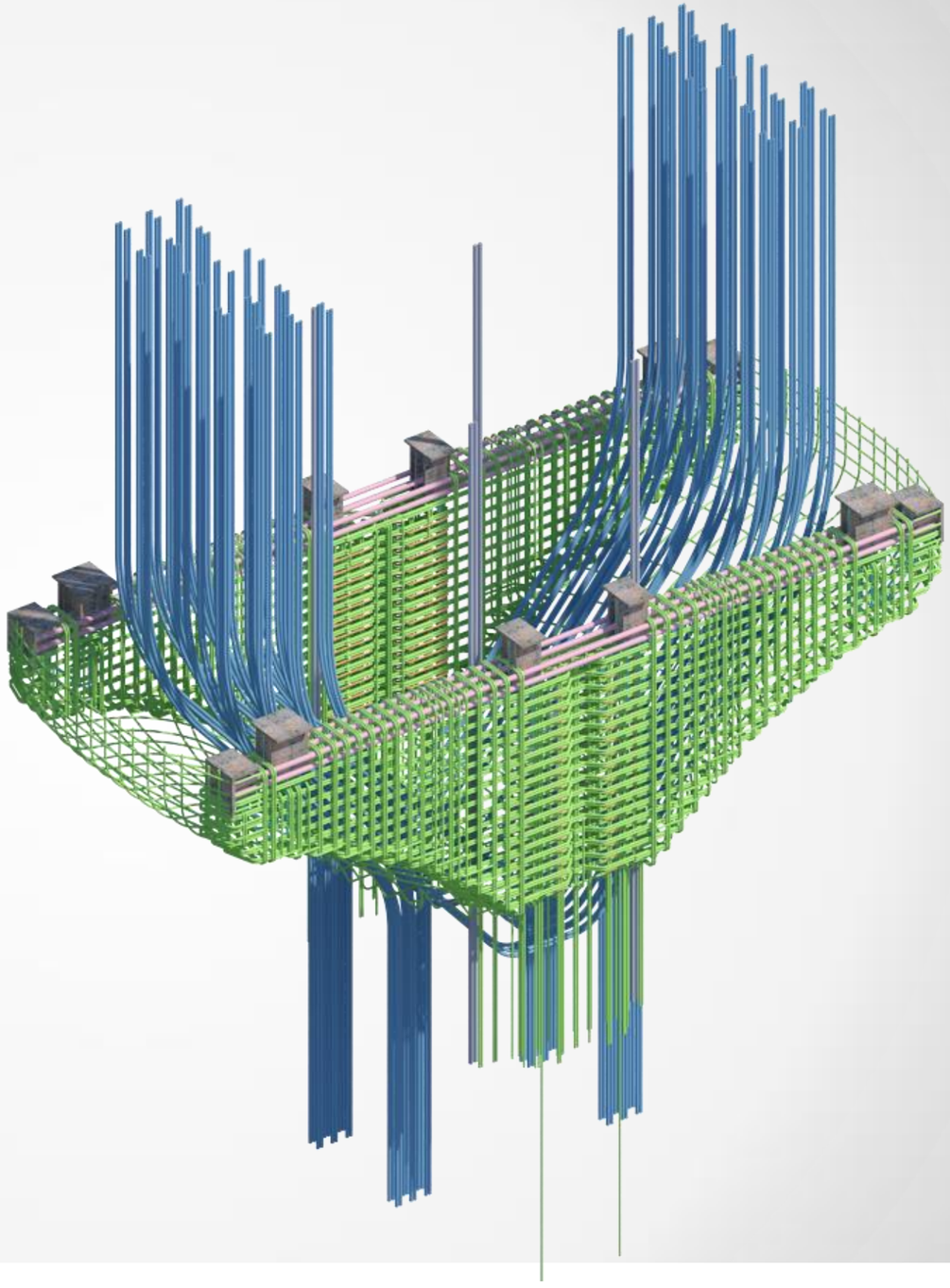
7.85
18.11
19.80
1TCA2A-01
3.49
0.58

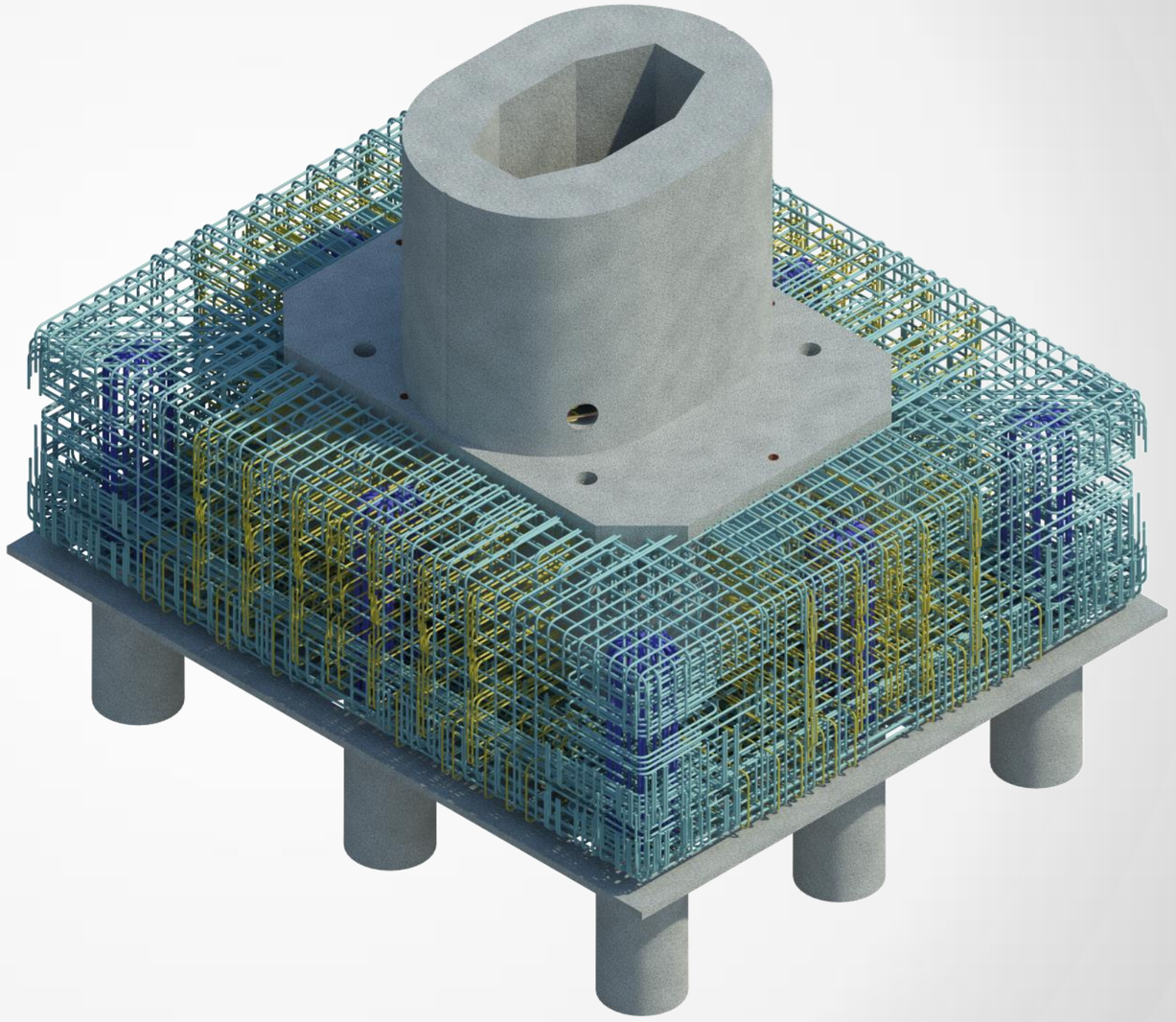
Rebar Models in Revit

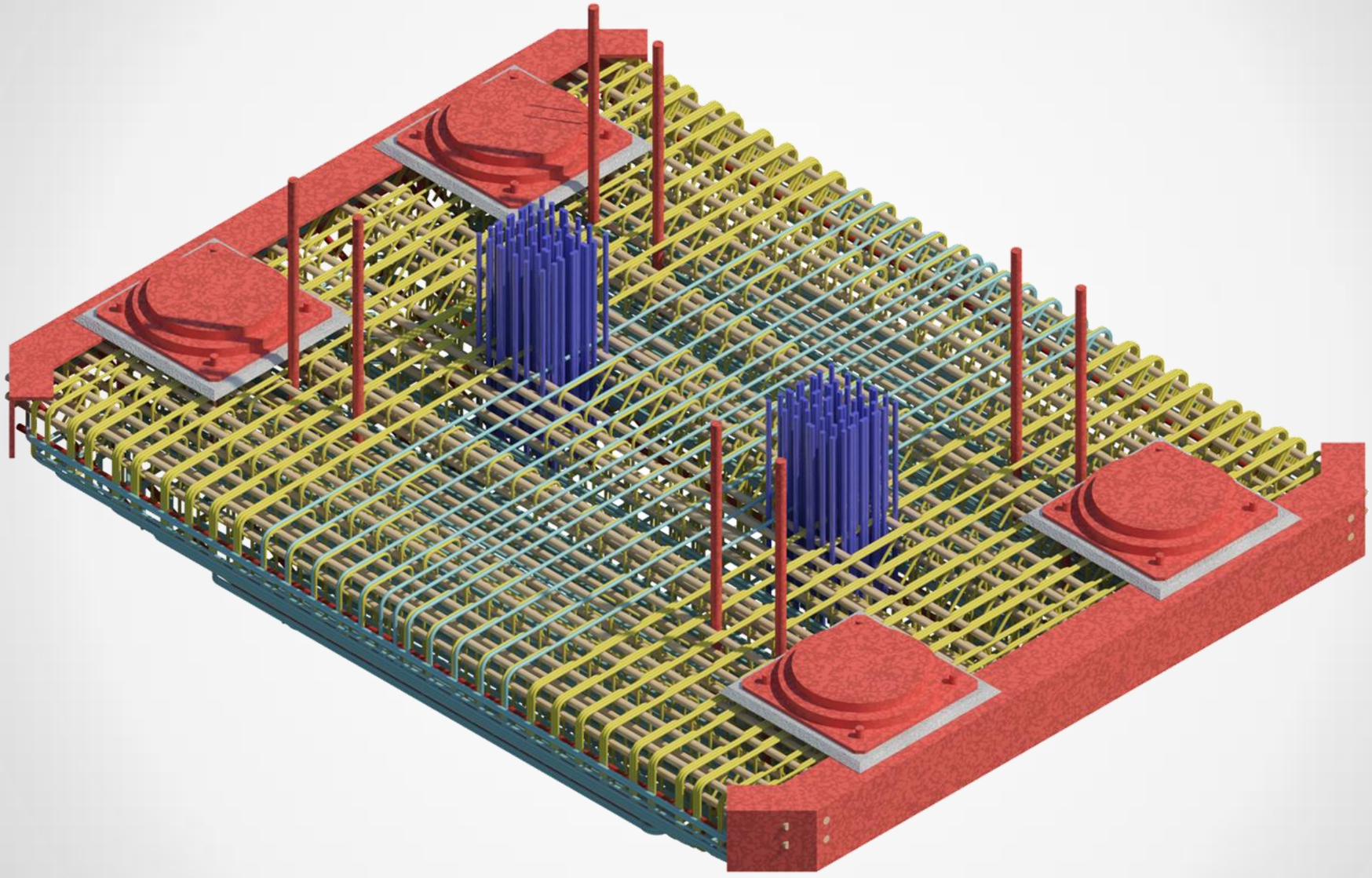


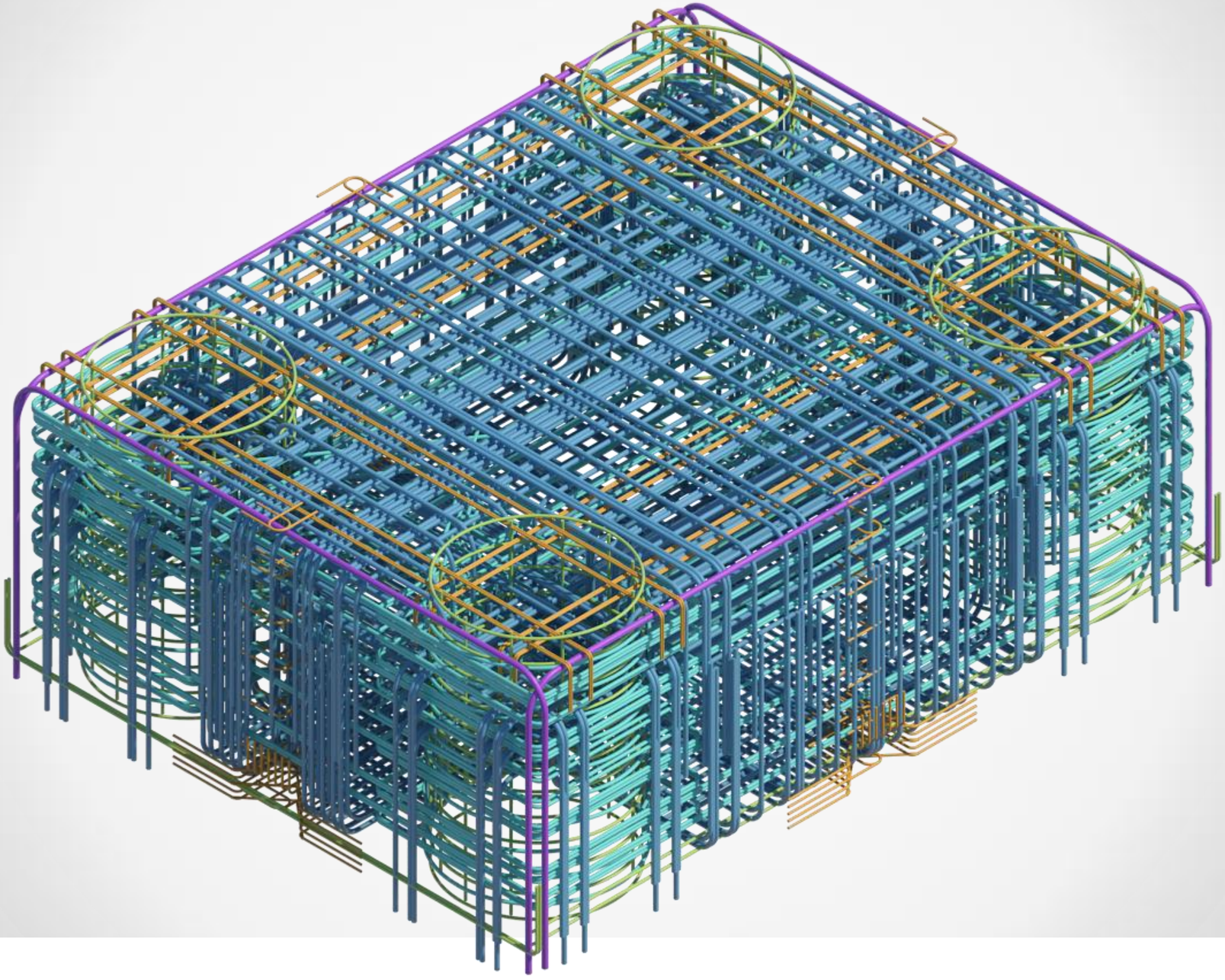


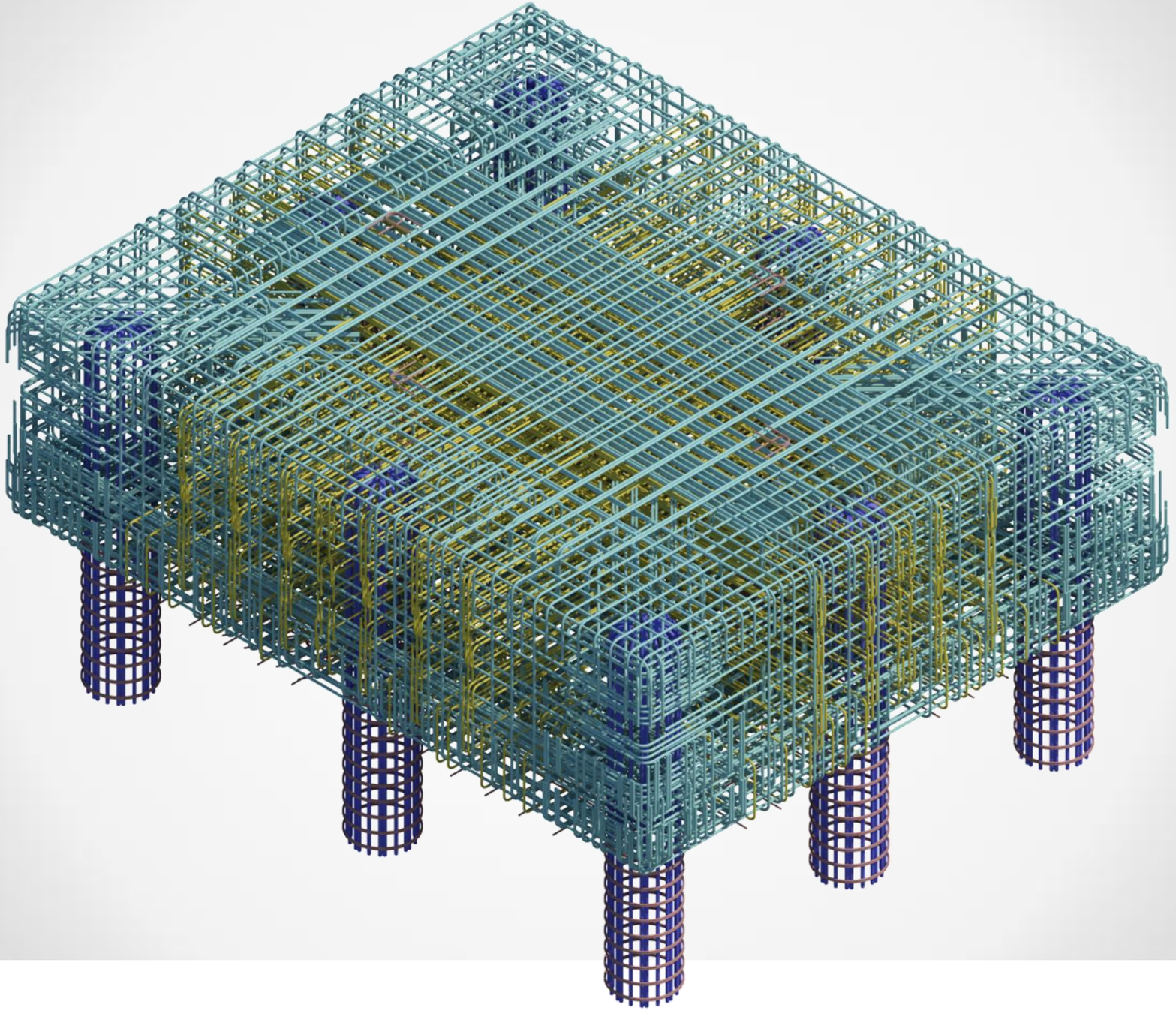












Shop Drawings

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

PRET

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:

00_Resumen de Varillas por Diametro

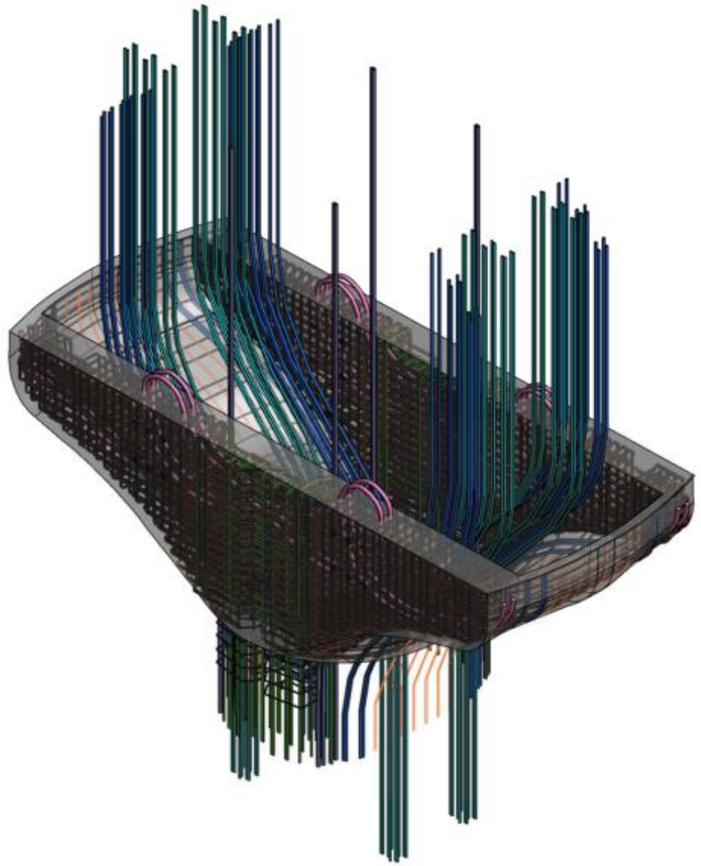
Model	Diametro	Cantidad	Suma Longitudinal	PesoLineal	Peso Total
Capitel					
#03	10 mm	84	136.87 m	0.560 kg/m	77 kg
#04	12 mm	462	1,642.26 m	0.996 kg/m	1,636 kg
#05	16 mm	112	350.22 m	1.560 kg/m	546 kg
#06	20 mm	48	372.83 m	2.250 kg/m	839 kg
#08	25 mm	40	352.94 m	3.975 kg/m	1,403 kg
#10	32 mm	16	84.57 m	6.225 kg/m	526 kg
		762	2,939.71 m		5,027 kg

02_Gancho de Izaje

CoidigoProyecto	Description	Cantidad	Suma Longitudinal	PesoLineal	Peso Total
Gancho de Izaje					
Izaje	Cable de 2" tipo Boa con alma de acero	8	54.17 m	8.938 kg/m	484 kg
		8	54.17 m		484 kg

03_Volumen de Geometria

Pertenece a	Tipo	Volumen
Capitel		
Capitel	Capitel 240x260_v3	7.624 m³
		7.624 m³



ICA bim

ELABORÓ:
Arq. Aarón De Marcos Estévez
MODELADOR

REVISÓ Y APROBÓ:
Ing. David Muñoz Vizuet
INGENIERIA

REVISÓ Y APROBÓ:
Ing. Fernando Mendez Galicia
SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

PRET

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

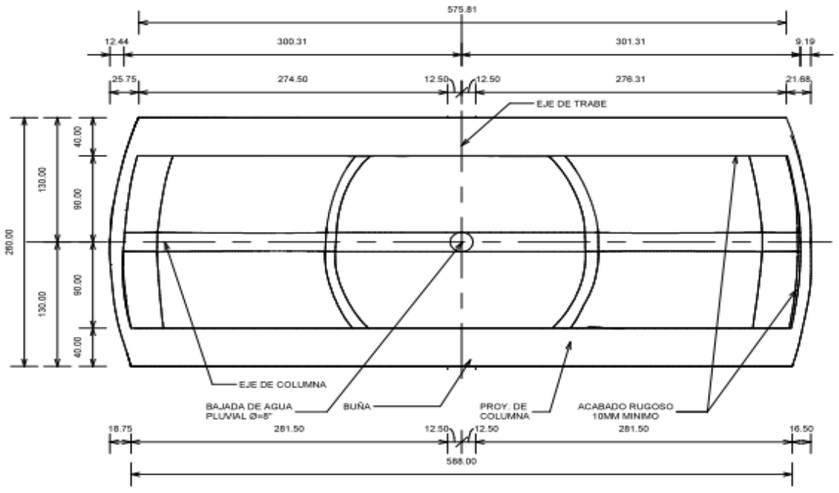
ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

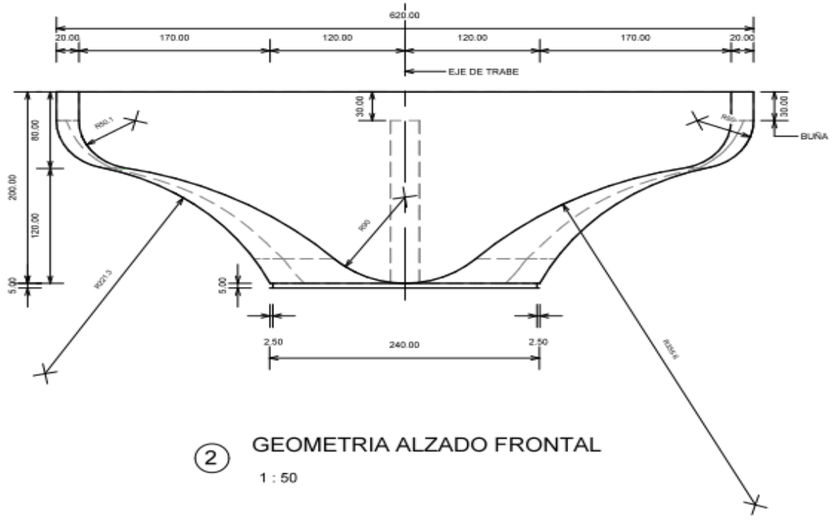
MATERIALES:

CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:



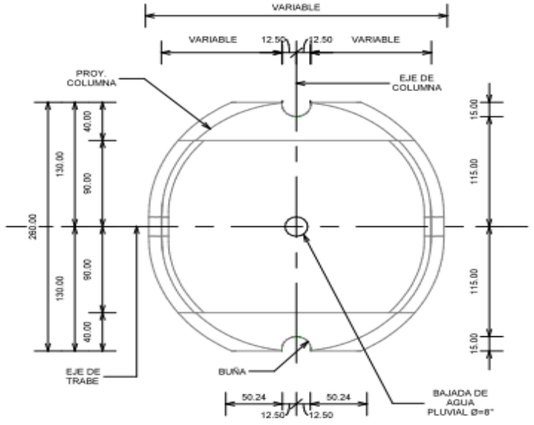
1 GEOMETRIA PLANTA

1 : 50



2 GEOMETRIA ALZADO FRONTAL

1 : 50



3 GEOMETRIA BASE CAPITEL

1 : 50

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

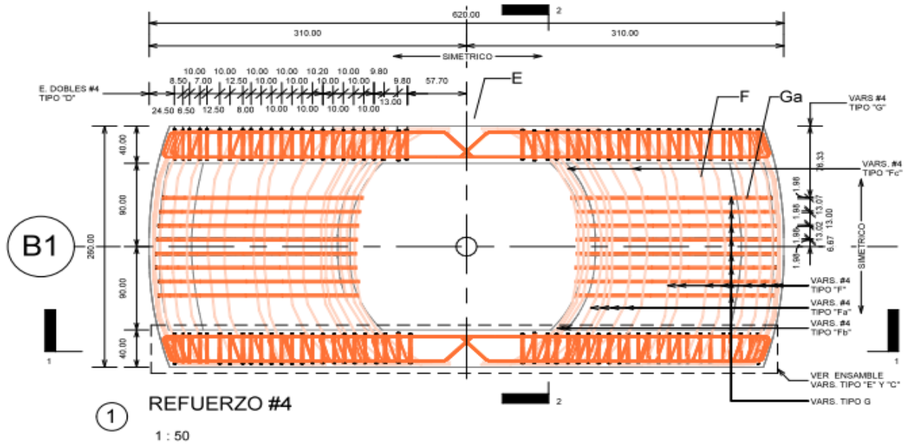
ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

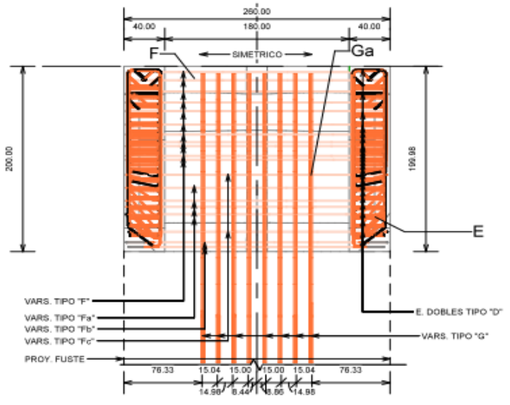
MATERIALES:

CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:



1 REFUERZO #4

1 : 50



3 REFUERZO 2-2 (#4)

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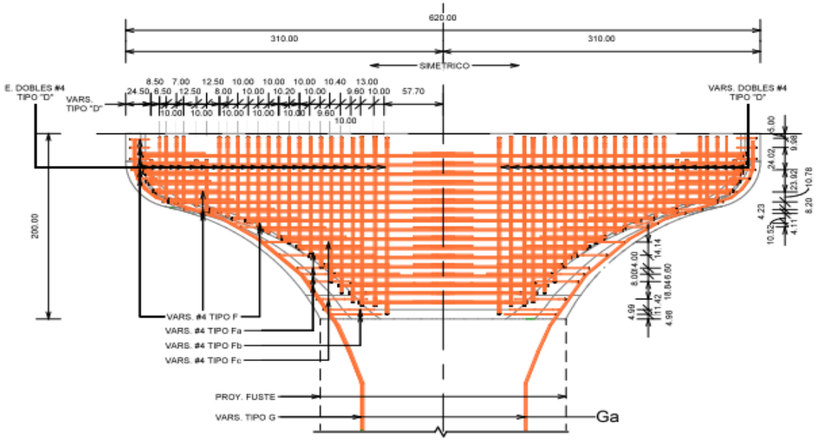


2 REFUERZO 1-1 (#4)

1 : 50

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

PRET

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

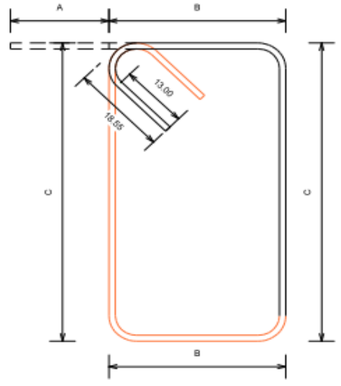
VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:

03_Varilla Tipo D

Codigo Proyecto	Clave	Modelo	Cantidad	Longitud Unitaria	Suma Longitudinal	A	B	C
D	D11	#04	8	312.59	25.01 m	18.64	33.42	109.00
D	D12	#04	8	302.59	24.21 m	18.64	33.42	104.00
D	D13	#04	8	287.76	23.02 m	18.64	33.42	96.59
D	D14	#04	8	279.53	22.36 m	18.64	33.42	92.47
D	D15	#04	8	272.33	21.79 m	18.64	33.42	88.87
D	D16	#04	8	266.33	21.31 m	18.64	33.42	85.87
D	D17	#04	8	258.50	20.68 m	18.64	33.42	81.96
D	D18	#04	8	205.94	16.48 m	18.64	33.42	55.68
D	D19	#04	8	194.59	15.57 m	18.64	33.42	50.00
D	D20	#04	8	238.64	19.09 m	18.64	33.42	72.03
D	D21	#04	8	238.64	19.09 m	18.64	33.42	72.03
D	D22	#04	8	227.32	18.19 m	18.64	33.42	66.37
D	D23	#04	4	216.88	8.68 m	18.64	33.42	61.15
D	D24	#04	8	146.59	11.73 m	18.64	33.42	26.00

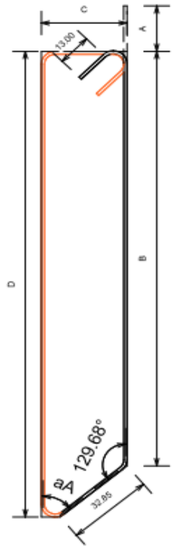


1 Varilla Tipo D

1 : 10

03_Varilla Tipo D_1

Codigo Proyecto	Clave	Modelo	Cantidad	Longitud Unitaria	Suma Longitudinal	A	B	C	D	aA
D	D01	#04	8	463.08	37.05 m	18.64	170.23	32.38	191.00	50.32°
D	D03	#04	8	445.10	35.61 m	18.64	154.47	32.61	183.00	41.34°
D	D05	#04	8	415.06	33.21 m	18.64	135.97	32.30	168.68	36.87°
D	D07	#04	8	363.63	29.09 m	18.64	123.04	32.30	141.00	55.23°
D	D09	#04	8	329.60	26.37 m	18.64	114.48	32.42	120.85	76.78°

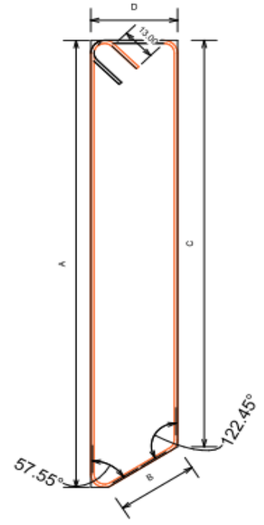


2 Varilla Tipo D01

1 : 20

03_Varilla Tipo D_2

Codigo Proyecto	Clave	Modelo	Cantidad	Longitud Unitaria	Suma Longitudinal	A	B	C	D
D	D02	#04	8	449.63	35.97 m	183.20	34.54	166.71	32.74

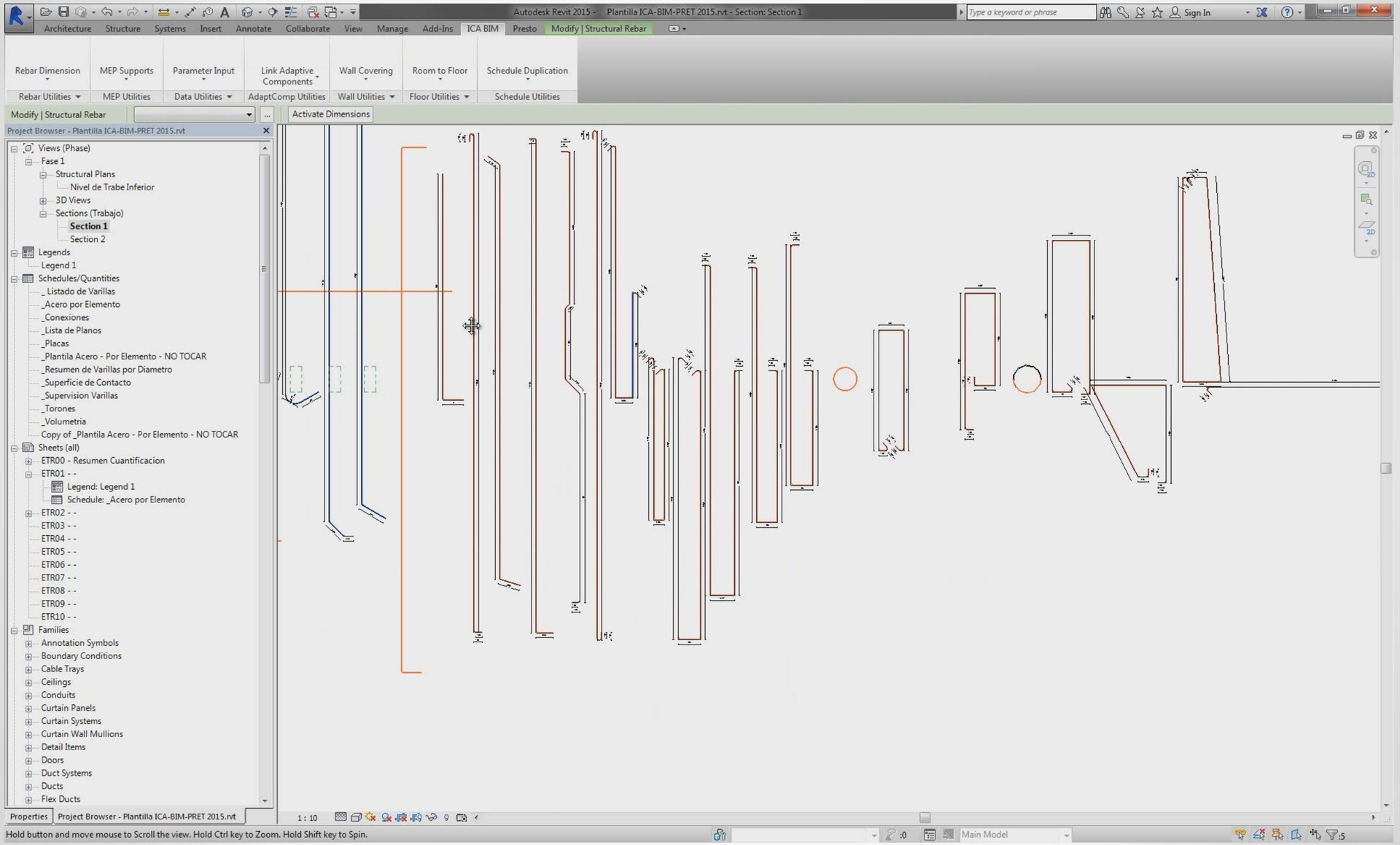


3 Varilla Tipo D02

1 : 20

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

Rebar Dimension App



INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:		FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50	COTAS: CM	02/09/14

ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

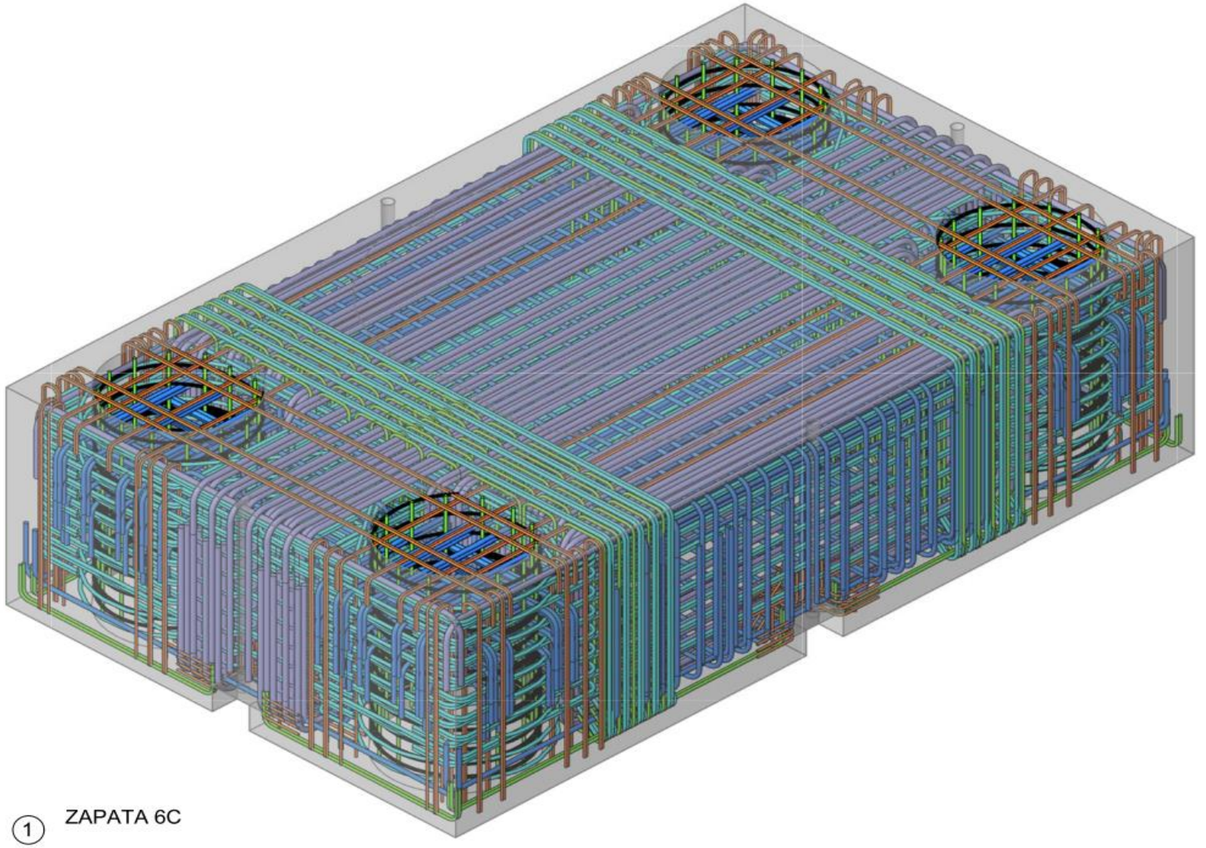
VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y
TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:

00_ Portada

No de Plano	Titulo de Plano
EZPT00	ZAPATA DE 6 CARRILES ZPT 6C
EZPT01	GEOMETRIA
EZPT02	ACERO DE REFUERZO #4
EZPT03	ACERO DE REFUERZO #5
EZPT04	ACERO DE REFUERZO #6
EZPT05	ACERO DE REFUERZO #8
EZPT06	ACERO DE REFUERZO #10
EZPT07	DESPIECE
EZPT08	DESPIECE
EZPT09	ENSAMBLE 1/2
EZPT10	ENSAMBLE 2/2



1 ZAPATA 6C

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

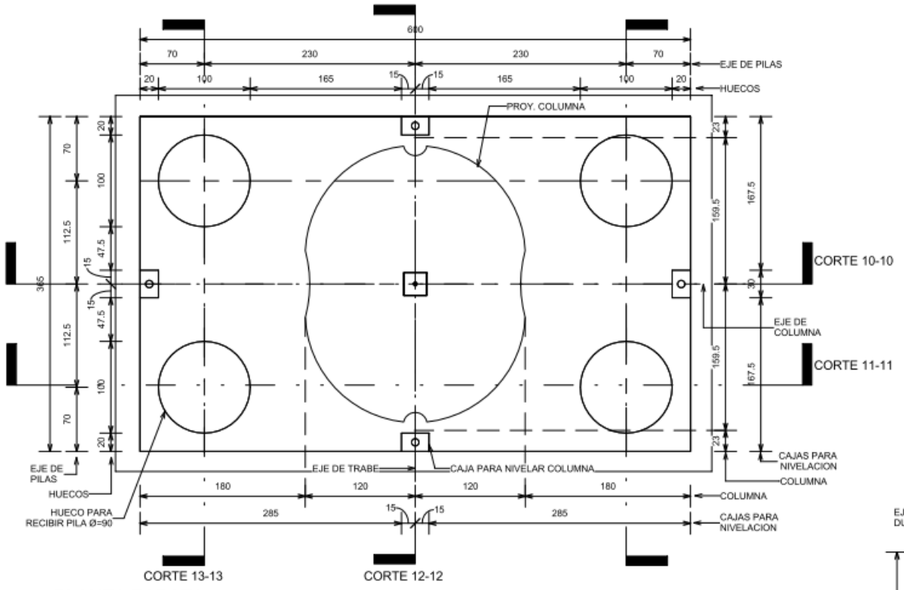
ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

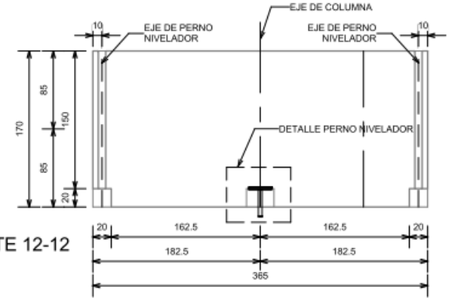
VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:



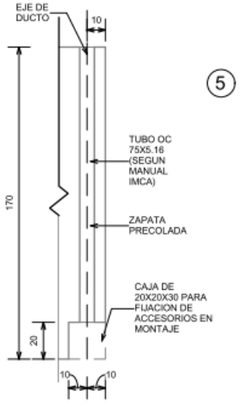
① PLANTA ZAPATA
1 : 50



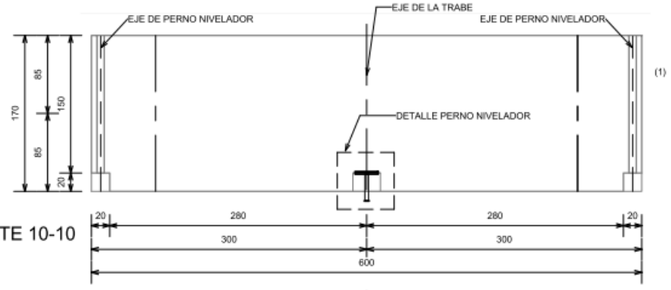
② CORTE 12-12
1 : 50

(1) PERNO NIVELADOR RECUPERABLE L=190cm Ø=1 1/4", fy=2530 kg/cm2 CON CABEZA HEXAGONAL Y ROSCA ESTANDAR

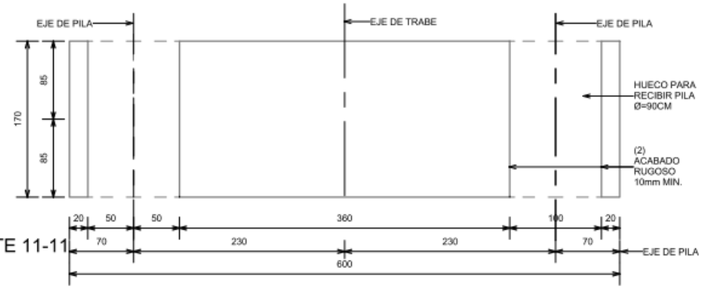
(2) COLOCAR ADITIVO QUE GARANTICE LA RUGOSIDAD DESDE EL COLADO



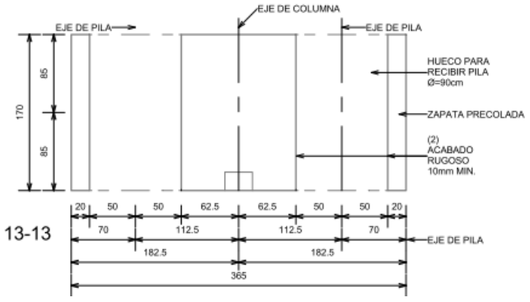
④ DETALLE-B
1 : 25



③ CORTE 10-10
1 : 50



⑤ CORTE 11-11
1 : 50



⑥ CORTE 13-13
1 : 50

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

PRET

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

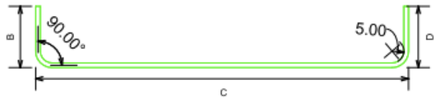
CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:

07_Varilla Tipo G

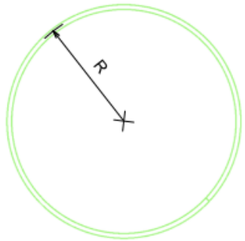
Coidigo Proyecto	Shape	Clave	Modelo	Cantidad	Longitud Unitaria	Suma Longitudinal	B	C	D
G	E_17	G01	#05	8	201.10	16.09 m	26.00	158.25	26.00
G	E_17	G02	#05	8	314.99	25.20 m	26.00	272.14	26.00
G	E_17	G03	#06	32	396.82	126.98 m	32.20	343.40	32.20
G	E_17	G04	#06	32	397.62	127.24 m	32.60	343.40	32.60
G	E_17	G05	#06	34	627.49	213.35 m	32.20	574.07	32.20
G	E_17	G06	#06	66	631.82	417.00 m	32.20	578.40	32.20
G	E_17	G07	#06	17	632.38	107.50 m	32.48	578.40	32.48
G	E_17	G08	#06	17	632.62	107.55 m	32.60	578.40	32.60
G	E_17	G09	#08	4	332.35	13.29 m	120.25	106.00	120.25
G	E_17	G10	#08	8	336.35	26.91 m	120.25	110.00	120.25
G	E_17	G11	#08	8	342.35	27.39 m	118.25	120.00	118.25
G	E_17	G13	#08	2	358.35	7.17 m	118.25	136.00	118.25
G	E_17	G14	#08	2	362.35	7.25 m	120.25	136.00	120.25
G	E_17	G15	#08	2	360.35	7.21 m	120.25	134.00	120.25
G	E_17	G16	#08	4	358.35	14.33 m	118.25	136.00	118.25
G	E_17	G18	#08	2	362.35	7.25 m	118.25	140.00	118.25
G	E_17	G19	#08	2	382.35	7.65 m	118.25	160.00	118.25
G	E_17	G20	#08	2	391.35	7.83 m	120.25	165.00	120.25
G	E_17	G21	#08	2	382.35	7.65 m	118.25	160.00	118.25
G	E_17	G22	#08	16	411.85	65.90 m	42.00	342.00	42.00
G	E_17	G23	#08	16	424.85	67.98 m	42.00	355.00	42.00
G	E_17	G24	#08	8	417.85	33.43 m	42.00	348.00	42.00
G	E_17	G25	#08	2	425.29	8.51 m	42.25	354.94	42.25
G	E_17	G26	#08	16	424.85	67.98 m	42.00	355.00	42.00
G	E_17	G27	#08	2	522.85	10.46 m	108.50	320.00	108.50
G	E_17	G28	#08	1	533.63	5.34 m	108.50	330.78	108.50
G	E_17	G29	#08	10	545.88	54.59 m	105.50	349.03	105.50
G	E_17	G30	#08	3	586.35	17.59 m	122.75	355.00	122.75
G	E_17	G31	#08	22	557.85	122.73 m	108.50	355.00	108.50
G	E_17	G32	#08	22	586.35	129.00 m	122.75	355.00	122.75
G	E_17	G33	#08	14	647.85	90.70 m	42.00	578.00	42.00
G	E_17	G34	#08	14	659.85	92.38 m	42.00	590.00	42.00
G	E_17	G35	#08	14	653.35	91.47 m	42.25	583.00	42.25
G	E_17	G36	#08	2	656.92	13.14 m	42.00	587.07	42.00
G	E_17	G37	#08	14	660.35	92.45 m	42.25	590.00	42.25
G	E_17	G38	#10	2	431.89	8.64 m	52.00	346.56	52.00
G	E_17	G39	#10	2	541.90	10.84 m	110.99	338.60	110.99
G	E_17	G40	#10	2	542.16	10.84 m	112.42	336.00	112.42
G	E_17	G40	#10	2	546.16	10.92 m	112.42	340.00	112.42
G	E_17	G41	#10	6	554.47	33.27 m	121.57	330.00	121.57
G	E_17	G42	#10	4	540.16	21.61 m	112.42	334.00	112.42
G	E_17	G43a	#10	4	541.90	21.68 m	110.99	338.60	110.99
G	E_17	G43b	#10	4	551.90	22.08 m	110.99	348.60	110.99
G	E_17	G44	#10	2	559.30	11.19 m	110.99	356.00	110.99
G	E_17	G45	#10	2	560.47	11.21 m	121.57	336.00	121.57
G	E_17	G46	#10	4	573.47	22.94 m	126.07	340.00	126.07
G	E_17	G47	#10	2	579.46	11.59 m	126.07	346.00	126.07
G	E_17	G48	#10	2	562.16	11.24 m	112.42	356.00	112.42
G	E_17	G49	#10	4	571.59	22.86 m	122.13	346.00	122.13
G	E_17	G50	#10	4	570.20	22.81 m	122.44	344.00	122.44
G	E_17	G51	#10	2	572.76	11.46 m	112.42	366.60	112.42
G	E_17	G52a	#10	4	573.80	22.95 m	122.44	347.60	122.44
G	E_17	G52b	#10	4	592.20	23.69 m	122.44	366.00	122.44
G	E_17	G53	#10	2	581.93	11.64 m	122.30	356.00	122.30
G	E_17	G54	#10	2	591.59	11.83 m	122.13	366.00	122.13

07_Varilla Tipo G

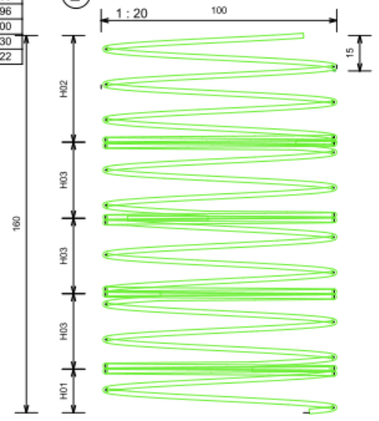
Coidigo Proyecto	Shape	Clave	Modelo	Cantidad	Longitud Unitaria	Suma Longitudinal	B	C	D
G	E_17	G55	#10	2	601.19	12.02 m	122.13	375.60	122.13
G	E_17	G56	#10	2	592.47	11.85 m	121.57	368.00	121.57
G	E_17	G57	#10	2	598.46	11.97 m	126.07	365.00	126.07
G	E_17	G58	#10	4	600.93	24.04 m	122.30	375.00	122.30
G	E_17	G59	#10	2	611.47	12.23 m	126.07	378.00	126.07
G	E_17	G60	#10	2	614.47	12.29 m	121.57	390.00	121.57
G	E_17	G61	#10	2	618.46	12.37 m	126.07	385.00	126.07
G	E_17	G62	#10	2	633.47	12.67 m	126.07	400.00	126.07
G	E_17	G63	#10	2	670.74	13.41 m	52.00	585.41	52.00
G	E_17	G64	#10	3	723.63	21.71 m	105.15	532.00	105.15
G	E_17	G65	#10	8	761.63	60.93 m	105.15	570.00	105.15
G	E_17	G66	#10	3	748.52	22.46 m	113.49	540.23	113.49
G	E_17	G67	#10	8	788.33	63.07 m	113.50	580.00	113.50
G	E_17	G68	#10	3	767.24	23.02 m	117.96	550.00	117.96
G	E_17	G69	#10	8	807.33	64.59 m	118.00	590.00	118.00
G	E_17	G70	#10	12	803.93	96.47 m	126.30	570.00	126.30
G	E_17	G71	#10	6	831.77	49.91 m	130.22	590.00	130.22



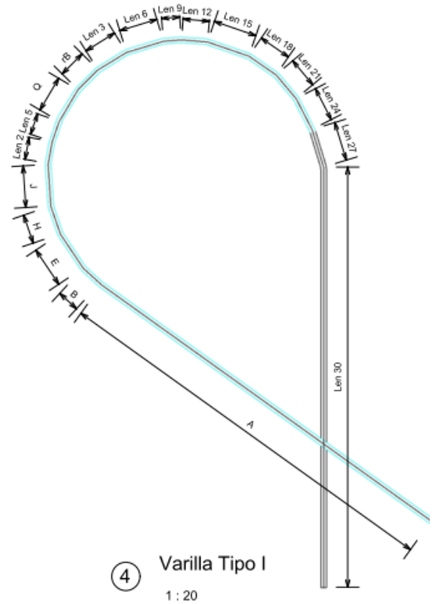
1 Varilla Tipo G
1 : 20



2 Varilla Tipo H
1 : 20



3 Varilla Tipo H_Zuncho
1 : 20



4 Varilla Tipo I
1 : 20

08_Varilla Tipo H

Codigo Proyecto	Clave	Modelo	Cantidad	Longitud Unitaria	Suma Longitudinal	R
H	H01	#05	4	628.81	25.15 m	49.60
H	H03	#05	12	1178.74	141.45 m	49.60
H	H02	#05	4	1182.97	47.32 m	49.60

09_Varilla Tipo I

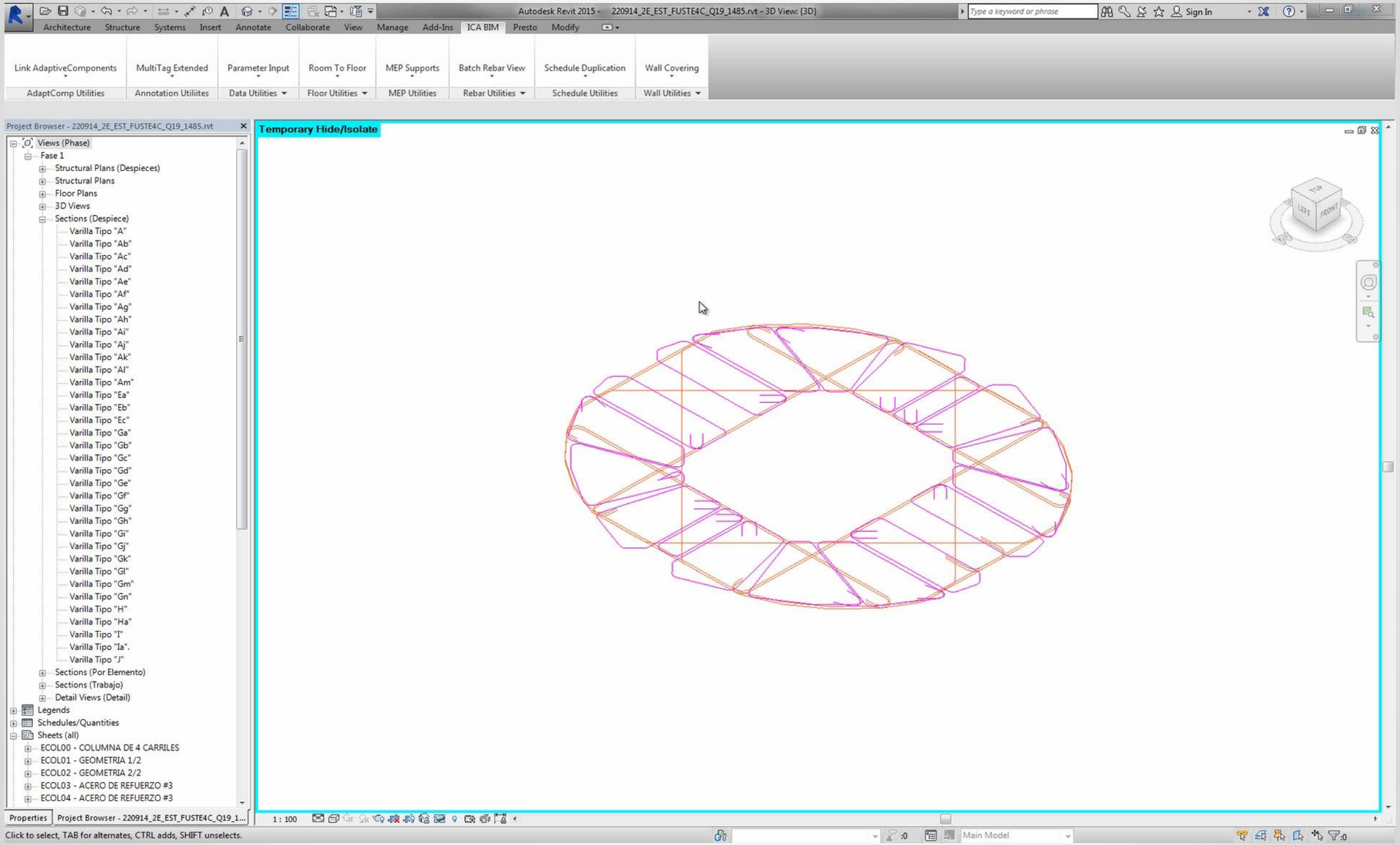
Coidigo Proyecto	Clave	Modelo	Cantidad	Longitud Unitaria	Suma Longitudinal	A	B	C	E	R	H	J	Len 2	Q	rB	Len 3	Len 6	Len 9	Len 12	Len 15	Len 18	Len 21	Len 24	Len 27	Len 30
I	I01	#06	40	581.57	232.63 m	172.57	10.30	10.22	17.71	0.91	12.82	18.34	9.13	14.44	12.22	3.92	16.22	7.81	11.45	19.41	14.40	13.52	15.32	16.64	178.42

ELABORÓ:
Arq. Aarón De Marcos Estévez
MODELADOR

REVISÓ Y APROBÓ:
Ing. David Muñoz Vizuet
INGENIERIA

REVISÓ Y APROBÓ:
Ing. Fernando Mendez Galicia
SUPERINTENDENTE

Automatic View + Rebar Dimension App



INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

PRET

ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

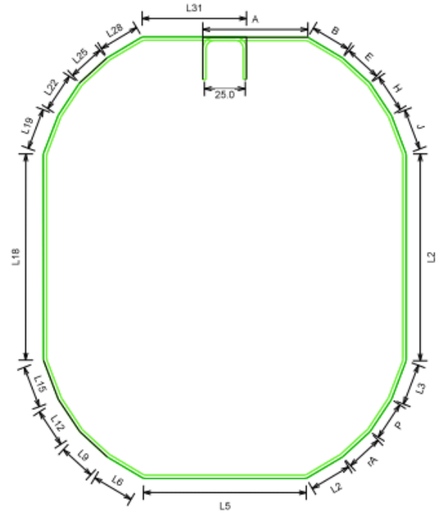
MATERIALES:

CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

13_Varilla Tipo F

Coidigo Proyecto	Clave	Modelo	Cantidad	Longitud Unitaria	Suma Longitudinal	A	B	E	H	J	L2	L3	L3	P	rA	L2	L5	L6	L9	L12	L15	L18	L19	L22	L25	L28	L31
F	M1_F11	#05	2	908.72	18.17 m	64.01	25.06	22.91	23.83	25.45	126.73	22.17	25.89	23.83	22.91	25.83	99.78	25.83	22.91	23.83	25.45	127.14	25.45	23.83	22.91	24.71	64.45
F	M1_F12	#05	2	907.16	18.14 m	63.98	25.07	23.03	23.74	25.42	125.88	22.16	25.97	23.74	23.03	25.82	99.75	25.82	23.03	23.74	25.42	126.40	25.42	23.74	23.03	24.73	64.41
F	M1_F13	#05	2	905.60	18.11 m	63.96	25.08	23.15	23.65	25.39	125.14	22.16	25.94	23.65	23.15	25.82	99.73	25.82	23.15	23.65	25.39	125.65	25.39	23.65	23.15	24.75	64.38
F	M1_F14	#05	2	904.04	18.08 m	63.94	25.08	23.27	23.57	25.35	124.39	22.15	25.90	23.57	23.27	25.81	99.70	25.81	23.27	23.57	25.36	124.90	25.36	23.57	23.27	24.77	64.35
F	M1_F15	#05	2	902.47	18.05 m	63.92	25.09	23.38	23.48	25.32	123.64	22.14	25.87	23.48	23.38	25.81	99.68	25.81	23.38	23.48	25.32	124.15	25.32	23.48	23.38	24.78	64.31
F	M1_F16	#05	2	900.91	18.02 m	63.89	25.10	23.50	23.39	25.29	122.90	22.13	25.83	23.39	23.50	25.80	99.65	25.80	23.50	23.39	25.29	123.40	25.29	23.39	23.50	24.80	64.28
F	M1_F17	#05	2	899.34	17.99 m	63.87	25.11	23.62	23.30	25.26	122.15	22.13	25.80	23.30	23.62	25.79	99.62	25.79	23.62	23.30	25.26	122.65	25.26	23.30	23.62	24.82	64.25
F	M1_F18	#05	2	897.78	17.96 m	63.85	25.12	23.74	23.22	25.23	121.40	22.12	25.77	23.22	23.74	25.79	99.60	25.79	23.74	23.22	25.23	121.90	25.23	23.22	23.74	24.83	64.21
F	M1_F19	#05	2	896.22	17.92 m	63.83	25.13	23.86	23.13	25.20	120.66	22.11	25.73	23.13	23.86	25.78	99.57	25.78	23.86	23.13	25.20	121.15	25.20	23.13	23.86	24.85	64.18
F	M1_F20	#05	2	894.65	17.89 m	63.81	25.13	23.98	23.04	25.17	119.91	22.10	25.70	23.04	23.98	25.78	99.55	25.78	23.98	23.04	25.17	120.41	25.17	23.04	23.98	24.87	64.15
F	M1_F21	#05	2	893.09	17.86 m	63.78	25.14	24.10	22.95	25.14	119.16	22.10	25.67	22.95	24.10	25.77	99.52	25.77	24.10	22.95	25.14	119.66	25.14	22.95	24.10	24.88	64.11
F	M1_F22	#05	2	891.52	17.83 m	63.76	25.15	24.22	22.86	25.11	118.42	22.09	25.63	22.86	24.22	25.77	99.50	25.77	24.22	22.86	25.11	118.91	25.11	22.86	24.22	24.90	64.08
F	M1_F23	#05	2	889.96	17.80 m	63.74	25.16	24.34	22.78	25.07	117.67	22.08	25.60	22.78	24.34	25.76	99.47	25.76	24.34	22.78	25.07	118.16	25.07	22.78	24.34	24.92	64.05
F	M1_F24	#05	2	888.40	17.77 m	63.72	25.17	24.46	22.69	25.04	116.92	22.07	25.57	22.69	24.46	25.76	99.44	25.76	24.46	22.69	25.04	117.41	25.04	22.69	24.46	24.93	64.02
F	M1_F25	#05	2	886.83	17.74 m	63.69	25.18	24.58	22.60	25.01	116.18	22.07	25.53	22.60	24.58	25.75	99.42	25.75	24.58	22.60	25.01	116.66	25.01	22.60	24.58	24.95	63.98
F	M1_F26	#05	2	885.27	17.71 m	63.67	25.19	24.70	22.51	24.98	115.43	22.06	25.50	22.51	24.70	25.74	99.39	25.74	24.70	22.51	24.98	115.91	24.98	22.51	24.70	24.97	63.95
F	M1_F27	#05	2	883.71	17.67 m	63.65	25.19	24.82	22.43	24.95	114.68	22.05	25.47	22.43	24.82	25.74	99.37	25.74	24.82	22.43	24.95	115.16	24.95	22.43	24.82	24.98	63.92
F	M1_F28	#05	2	882.14	17.64 m	63.63	25.20	24.94	22.34	24.92	113.94	22.04	25.43	22.34	24.94	25.73	99.34	25.73	24.94	22.34	24.92	114.41	24.92	22.34	24.94	25.00	63.88
F	M1_F29	#05	2	880.58	17.61 m	63.61	25.21	25.05	22.25	24.89	113.19	22.04	25.40	22.25	25.05	25.73	99.31	25.73	25.05	22.25	24.89	113.67	24.89	22.25	25.05	25.02	63.85
F	M1_F30	#05	2	879.02	17.58 m	63.58	25.22	25.17	22.16	24.86	112.44	22.03	25.36	22.16	25.17	25.72	99.29	25.72	25.17	22.16	24.86	112.92	24.86	22.16	25.17	25.03	63.82
F	M1_F31	#05	2	877.46	17.55 m	63.56	25.23	25.29	22.08	24.82	111.70	22.02	25.33	22.08	25.29	25.72	99.26	25.72	25.29	22.08	24.82	112.17	24.82	22.08	25.29	25.05	63.78
F	M1_F32	#05	2	875.50	17.51 m	63.53	25.24	25.44	21.97	24.79	110.76	22.01	25.29	21.97	25.44	25.71	99.23	25.71	25.44	21.97	24.79	111.23	24.79	21.97	25.44	25.07	63.74
F	M1_F33	#05	2	873.55	17.47 m	63.51	25.25	25.59	21.86	24.75	109.83	22.00	25.25	21.86	25.59	25.70	99.20	25.70	25.59	21.86	24.75	110.30	24.75	21.86	25.59	25.09	63.70
F	M1_F34	#05	2	871.60	17.43 m	63.48	25.26	25.74	21.75	24.71	108.90	21.99	25.21	21.75	25.74	25.70	99.17	25.70	25.74	21.75	24.71	109.36	24.71	21.75	25.74	25.11	63.66
F	M1_F35	#05	2	869.64	17.39 m	63.45	25.27	25.89	21.64	24.67	107.96	21.98	25.16	21.64	25.89	25.69	99.13	25.69	25.89	21.64	24.67	108.42	24.67	21.64	25.89	25.13	63.62
F	M1_F36	#05	2	867.69	17.35 m	63.42	25.28	26.04	21.53	24.63	107.03	21.97	25.12	21.53	26.04	25.68	99.10	25.68	26.04	21.53	24.63	107.49	24.63	21.53	26.04	25.16	63.58
F	M1_F37	#05	2	865.74	17.31 m	63.39	25.29	26.19	21.42	24.59	106.10	21.97	25.08	21.42	26.19	25.68	99.07	25.68	26.19	21.42	24.59	106.55	24.59	21.42	26.19	25.18	63.53
F	M1_F38	#05	2	863.78	17.28 m	63.37	25.30	26.34	21.31	24.55	105.16	21.96	25.04	21.31	26.34	25.67	99.04	25.67	26.34	21.31	24.55	105.62	24.55	21.31	26.34	25.20	63.49
F	M1_F39	#05	2	861.83	17.24 m	63.34	25.31	26.49	21.20	24.51	104.23	21.95	25.00	21.20	26.49	25.66	99.00	25.66	26.49	21.20	24.51	104.68	24.51	21.20	26.49	25.22	63.45
F	M1_F40	#05	2	859.23	17.18 m	63.30	25.33	26.69	21.06	24.46	102.99	21.93	24.94	21.06	26.69	25.65	98.96	25.65	26.69	21.06	24.46	103.43	24.46	21.06	26.69	25.25	63.40
F	M1_F41	#05	2	856.62	17.13 m	63.26	25.34	26.89	20.91	24.41	101.74	21.92	24.88	20.91	26.89	25.64	98.92	25.64	26.89	20.91	24.41	102.18	24.41	20.91	26.89	25.27	63.34
F	M2_F42	#05	2	854.02	17.08 m	63.23	25.35	27.09	20.76	24.36	100.50	21.91	24.83	20.76	27.09	25.63	98.88	25.63	27.09	20.76	24.36	100.94	24.36	20.76	27.09	25.30	63.28
F	M2_F43	#05	2	851.42	17.03 m	63.19	25.37	27.29	20.62	24.30	99.25	21.90	24.77	20.62	27.29	25.62	98.83	25.62	27.29	20.62	24.31	99.69	24.31	20.62	27.29	25.33	63.23
F	M2_F44	#05	2	848.82	16.98 m	63.15	25.38	27.49	20.47	24.25	98.01	21.88	24.72	20.47	27.49	25.62	98.79	25.62	27.49	20.47	24.25	98.44	24.25	20.47	27.49	25.36	63.17
F	M2_F45	#05	2	846.21	16.92 m	63.12	25.40	27.69	20.33	24.20	96.76	21.87	24.66	20.33	27.69	25.61	98.75	25.61	27.69	20.33	24.20	97.19	24.20	20.33	27.69	25.38	63.12
F	M2_F46	#05	2	843.61	16.87 m	63.08	25.41	27.88	20.18	24.15	95.52	21.86	24.61	20.18	27.88	25.60	98.70	25.60	27.88	20.18	24.15	95.94	24.15	20.18	27.88	25.41	63.06
F	M3_F47	#05	2	841.01	16.82 m	63.04	25.42	28.08	20.03	24.10	94.28	21.84	24.55	20.03	28.08	25.59	98.66	25.59	28.08	20.03	24.10	94.70	24.10	20.03	28.08	25.44	63.01
F	M3_F48	#05	2	838.41	16.77 m	63.00	25.44	28.28	19.89	24.04	93.03	21.83	24.49	19.89	28.28	25.58	98.62	25.58	28.28	19.89	24.05	93.45	24.05	19.89	28.28	25.47	62.95
F	M3_F49	#05	2	835.81	16.72 m	62.97	25.45	28.48	19.74	23.99	91.79	21.82	24.44	19.74	28.48	25.57	98.57	25.57	28.48	19.74	23.99	92.20	23.99	19.74	28.48	25.50	62.90
F	M3_F50	#05	2	833.20	16.66 m	62.93	25.47	28.68	19.60	23.94	90.54	21.81	24.38	19.60	28.68	25.56	98.53	25.56	28.68	19.60	23.94	90.95	23.94	19.60	28.68	25.52	62.84
F	M3_F51	#05	2	822.79	16.46 m	62.78	25.52	29.48	19.01	23.73	85.63	21.76	24.09	19.01	29.48	25.52	98.36	25.52	29.48	19.01	23.73	85.96	23.73	19.01	29.48	25.64	62.62
F	M4_F52	#05	2	822.79	16.46 m	62.78	25.52	29.48	19.01	23.73	85.63	21.76	24.09	19.01	29.48	25.52	98.36	25.52	29.48	19.01	23.73	85.96	23.73	19.01	29.48	25.64	62.62
F	M4_F53	#05	2	822.79	16.46 m	62.78	25.52	29.48	19.01	23.73	85.63	21.76	24.09	19.01	29.48	25.52	98.36	25.52	29.48	19.01	23.73	85.96	23.73	19.01	29.48	25.64	62.62
F	M4_F54	#05	2	822.79	16.46 m	62.78	25.52	29.48	19.01	23.73	85.63	21.76	24.09	19.01	29.48	25.52	98.36	25.52	29.48	19.01	23.73	85.96	23.73	19.01	29.48	25.64	62.62
F	Z_F01	#05	2	925.07	18.50 m	63.62	27.64	23.52	24.46	18.08	143.28	23.73	18.21	24.46	23.52	27.64	100.25	27.64	23.52	24.46	18.65	142.32	18.65	24.46	23.52	27.64	63.56
F	Z_F02	#05	2	923.44	18.47 m	63.66	27.38	23.46	24.39	18.82	141.51	23.57	19.10	24.39	23.46	27.46	100.20	27.46	23.46	24.39	19.33	140.81	19.33	24.39	23.46	27.34	63.65
F	Z_F03	#05	2	921.80	18.44 m	63.70	27.12	23.40	24.33	19.55	139.86	23.41	19.87	24.33	23.40	27.27	100.15	27.27	23.40	24.33	20.01	139.29	20.01	24.33	23.40	27.05	63.74
F	Z_F04	#05	2	920.17	18.40 m	63.74	26.86	23.33	24.27	20.29	138.20	23.26	20.63	24.27	23.33	27.09	100.11	27.09	23.33	24.27	20.69	137.77	20.69	24.27	23.33	26.76	63.83
F	Z_F05	#05	2	918.54	18.37 m	63.78	26.60	23.27	24.21	21.03	136.55	23.10	21.40	24.21	23.27	26.91	100.06	26.91	23.27	24.21	21.37	136.25	21.37	24.21	23.27	26.47	63.92
F	Z_F06	#05	2	916.90	18.34 m	63.81	26.35	23.21	24.14	21.76	134.90	22.95	22.17	24.14	23.21	26.73	100.01	26.73	23.21	24.14	22.05	134.73	22.05	24.14	23.21	26.18	64.00
F	Z_F07	#05	2	915.27	18.31 m	63.85	26.09	23.15	24.08	22.50	133.24	22.79	22.93	24.08	23.15	26.55	99.97	26.55	23.15	24.08	22.73	133.22	22.73	24.08	23.15	25.88	64.09
F	Z_F08	#05	2	913.63	18.27 m	63.89	25.83	23.09	24.02	23.24	131.59	22.64	23.70	24.02	23.09	26.37	99.92	26.37	23.09	24.02	23.41	131.70	23.41	24.02	23.09	25.59	64.18
F	Z_F09	#05	2	912.00	18.24 m	63.93	25.57	23.03	23.95	23.98	129.94	22.48	24.47	23.95	23.03	26.19	99.87	26.19	23.03	23.95	24.09	130.18	24.09	23.95	23.03	25.30	64.27
F	Z_F10	#05	2	910.36	18.21 m	63.97	25.32	22.97	23.89	24.71	128.28	22.33	25.24	23.89	22.97	26.01	99.83	26.01	22.97	23.89	24.77	128.66	24.77	23.89	22.97	25.01	64.36



① Varilla Tipo F

1 : 30

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

PRET

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

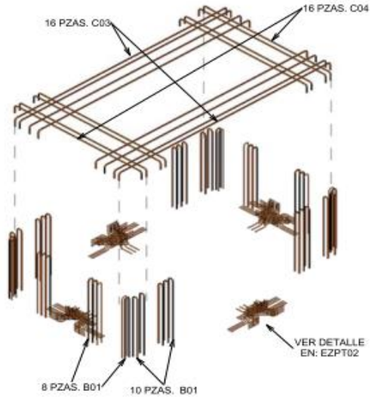
ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

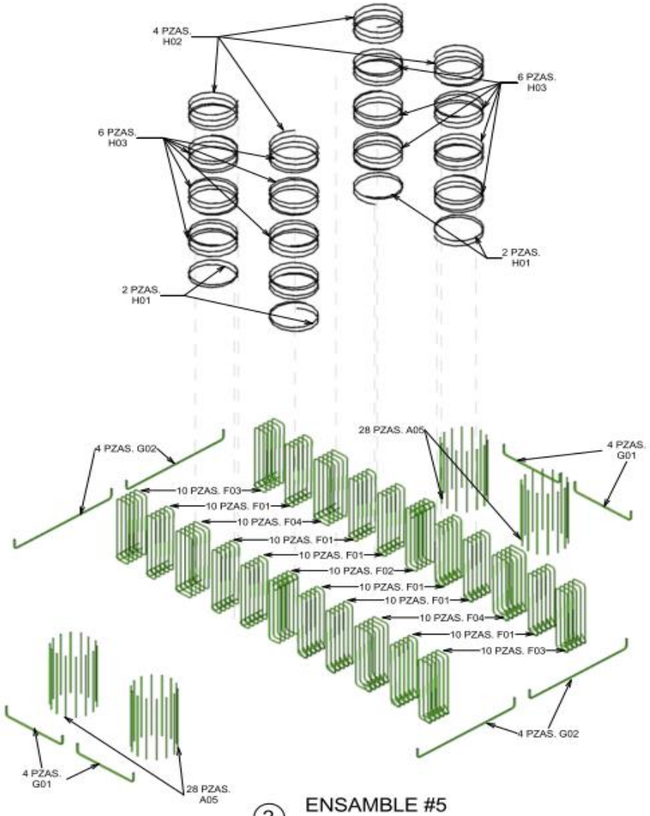
VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:



1 ENSAMBLE #4



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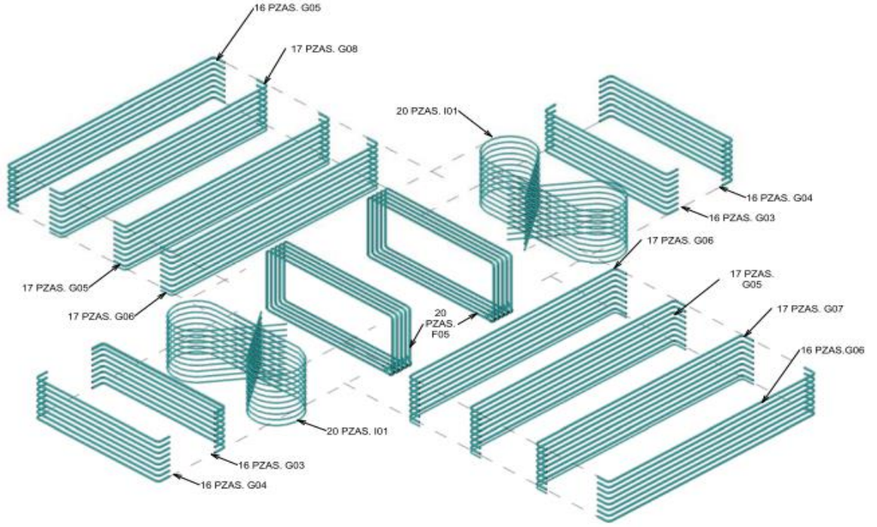


3 ENSAMBLE #6

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS

PREFABRICADOS Y TRANSPORTES S.A. DE C.V.

BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

PRET

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 — COTAS: CM	02/09/14

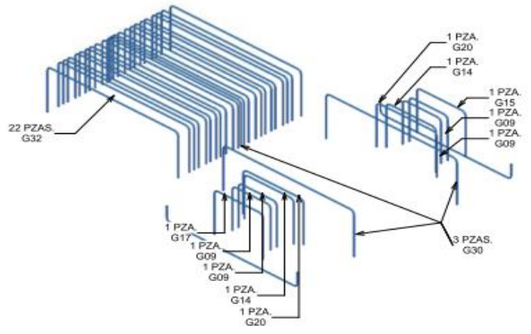
ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

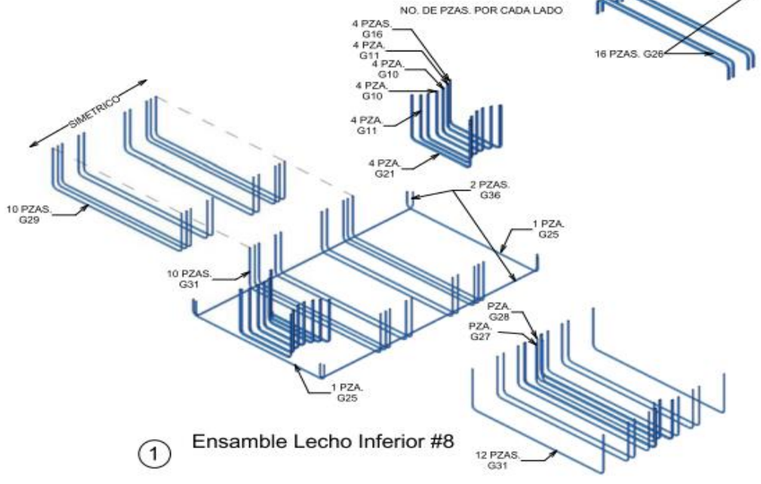
VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

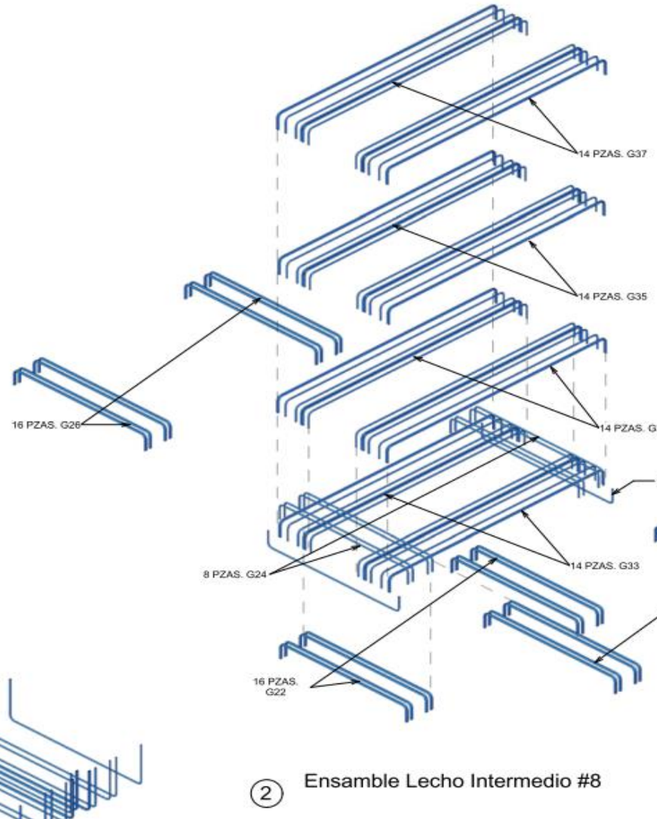
CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:



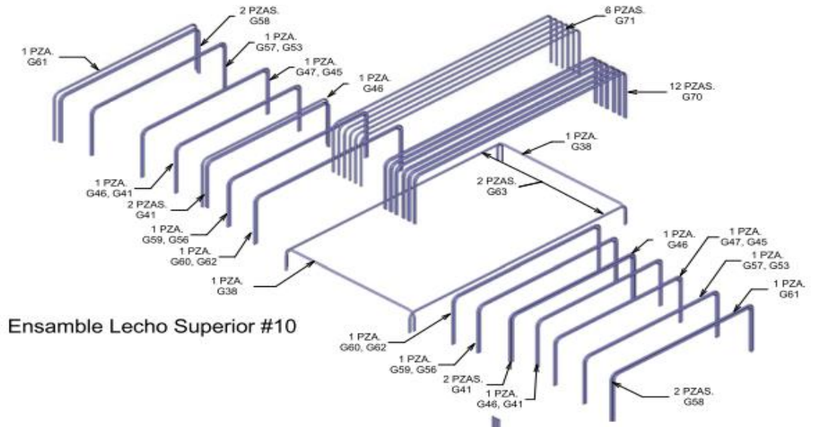
3 Ensamble Lecho Superior #8



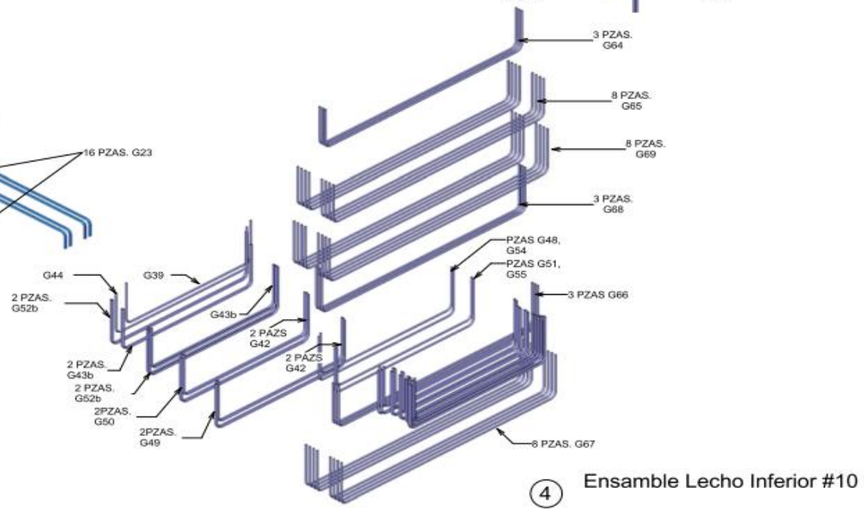
1 Ensamble Lecho Inferior #8



2 Ensamble Lecho Intermedio #8



5 Ensamble Lecho Superior #10



4 Ensamble Lecho Inferior #10

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

ICA bim

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:

00_Resumen de Varillas por Diametro

Modelo	Diametro	Cantidad	Suma Longitudinal	PesoLineal	Peso Total
#04	16 mm	156	279.77 m	0.996 kg/m	279 kg
Fuste					
#04	16 mm	422	702.76 m	0.996 kg/m	700 kg
#05	20 mm	674	2,955.65 m	1.560 kg/m	4,611 kg
#06	20 mm	120	833.42 m	2.250 kg/m	1,875 kg
#08	30 mm	136	823.91 m	3.975 kg/m	3,275 kg
		1508	5,595.51 m		10,740 kg

01_Torones

Coidigo Proyecto	Descripción	Diametro (mm)	Cantidad	Suma Longitudinal	PesoLineal	Peso Total
Toron 3/8"						
	Toron 3/8"	0.95	340	3,405.56 m	0.432 kg/m	1,471 kg
			340	3,405.56 m		1,471 kg

02_Volumetria de Geometria Fuste

Pertenece a	Tipo	Volumen
Fuste	B6	23.75 m³
		23.75 m³

03_Volumetria Aligeramiento Poliestireno

Pertenece a	Tipo	Volumen
Aligeramiento		
Aligeramiento	B6	11.55 m³
1		11.55 m³

04_Tubo B.A.P.

Descripción	Diametro	Longitud (ml)
TUBERÍA DE ACERO ESPECIFICACIÓN ASTM - A53 DE DIAM. 203 mm. (8") CÉDULA 40.	200 mmø	150.5
TUBERÍA DE ACERO ESPECIFICACIÓN ASTM - A53 DE DIAM. 203 mm. (8") CÉDULA 40.	200 mmø	27.8
TUBERÍA DE ACERO ESPECIFICACIÓN ASTM - A53 DE DIAM. 203 mm. (8") CÉDULA 40.	200 mmø	99.6
TUBERÍA DE ACERO ESPECIFICACIÓN ASTM - A53 DE DIAM. 203 mm. (8") CÉDULA 40.	200 mmø	96.6
TUBERÍA DE ACERO ESPECIFICACIÓN ASTM - A53 DE DIAM. 203 mm. (8") CÉDULA 40.	200 mmø	98.8
TUBERÍA DE ACERO ESPECIFICACIÓN ASTM - A53 DE DIAM. 203 mm. (8") CÉDULA 40.	200 mmø	98.1
TUBERÍA DE ACERO ESPECIFICACIÓN ASTM - A53 DE DIAM. 203 mm. (8") CÉDULA 40.	200 mmø	644.2
		1215.5

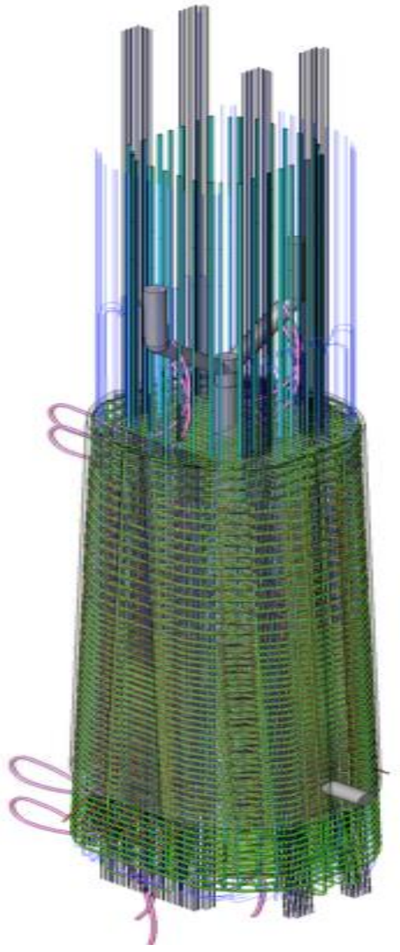
05_Accesorios Tuberia de Acero B.A.P.

Accesorio	Tipo	Pertenece a	Diametro	Pieza
Codo 45	Fierro Fundido	Fuste	200 mmø-200 mmø	1
"Y"	Fierro Fundido	Fuste	200 mmø-200 mmø-200 mmø-200 mmø	1
Codo 45	Fierro Fundido	Fuste	200 mmø-200 mmø	1
Codo 45	Fierro Fundido	Fuste	200 mmø-200 mmø	1
Codo 45	Fierro Fundido	Fuste	200 mmø-200 mmø	1
				5

06_Ganchos de Izaje

Coidigo Proyecto	Descripción	Diametro	Longitud Unitaria	Cantidad	Suma Longitudinal
GI	Cable de 1 1/2" tipo Boa con alma de acero fpu=7877kg/cm2	40 mm	7.19 m	8	57.52 m
				8	57.52 m

68 CONECTORES PARA VARILLA DEL #8



ELABORÓ:

Arq. Aarón De Marcos Estévez
MODELADOR

REVISÓ Y APROBÓ:

Ing. David Muñoz Vizuet
INGENIERIA

REVISÓ Y APROBÓ:

Ing. Fernando Mendez Galicia
SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

PRET

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

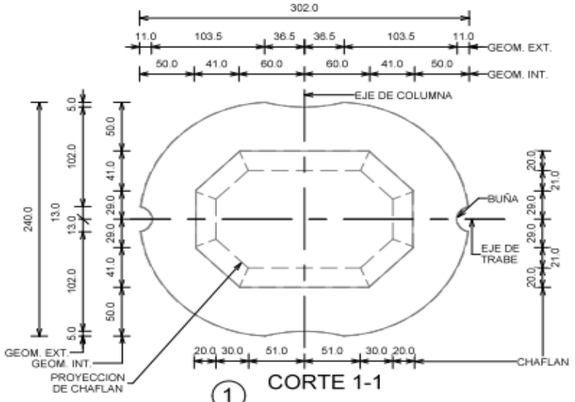
ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

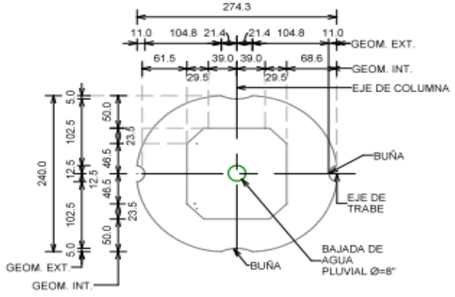
VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

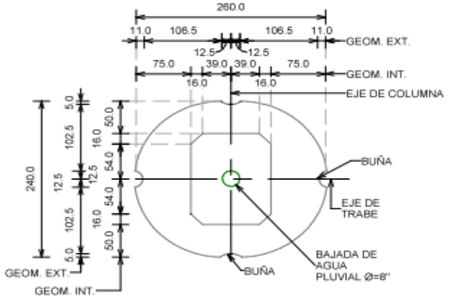
CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:



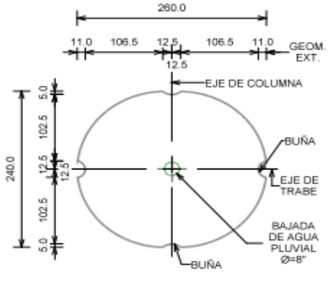
1 CORTE 1-1
1 : 50



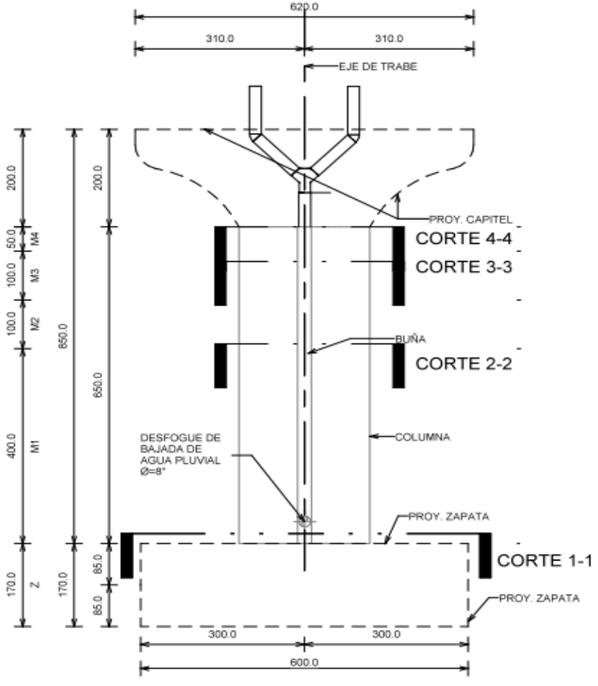
2 CORTE 2-2
1 : 75



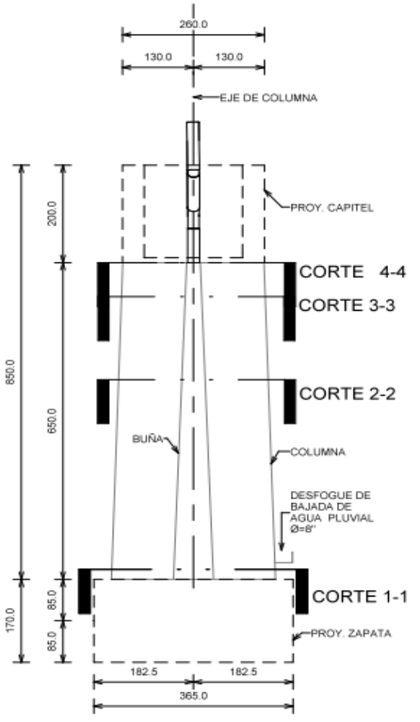
5 CORTE 3-3
1 : 75



6 CORTE 4-4
1 : 75



3 ELEVACION TRANSVERSAL
1 : 100



4 ELEVACION LONGITUDINAL
1 : 100

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

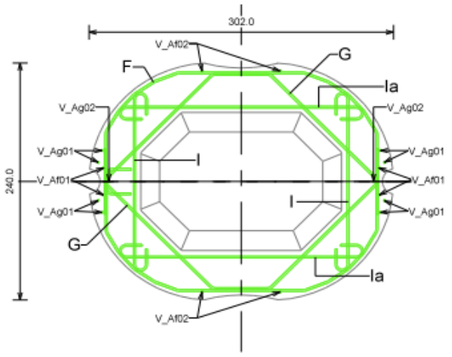
ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

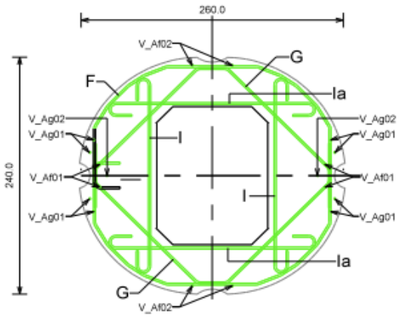
VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

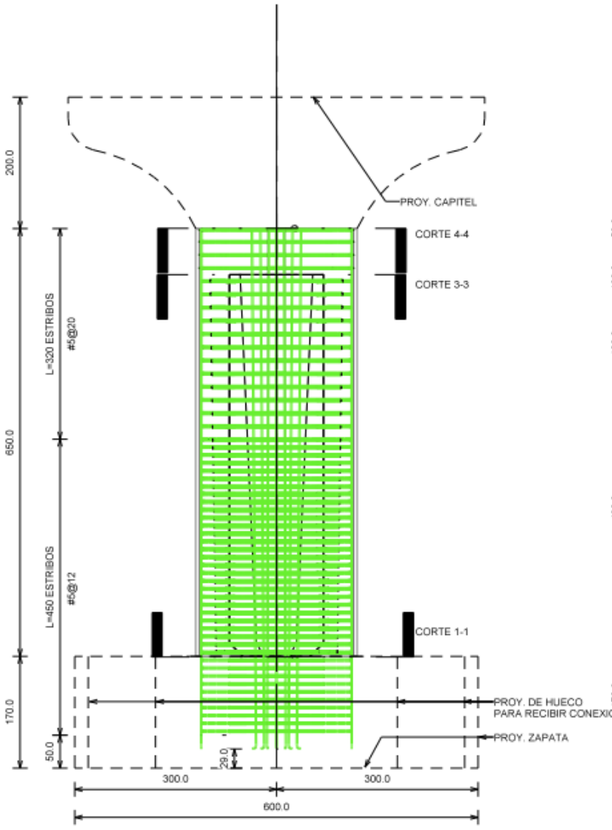
CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:



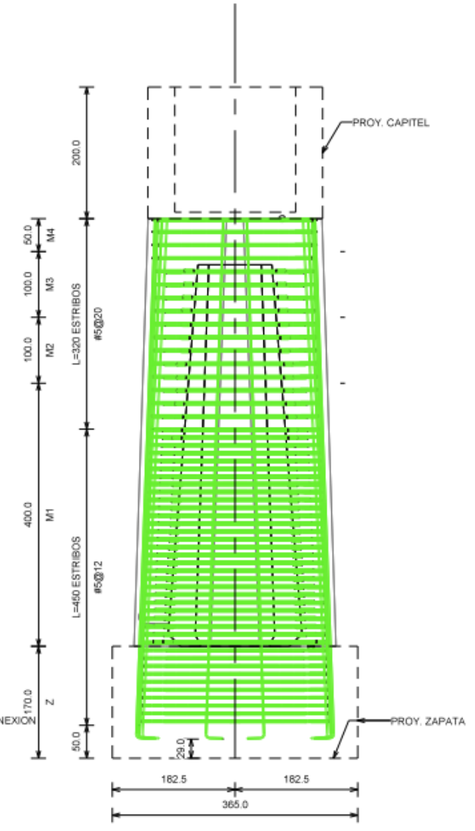
1 REFUERZO CORTE 1-1 #5
1 : 50



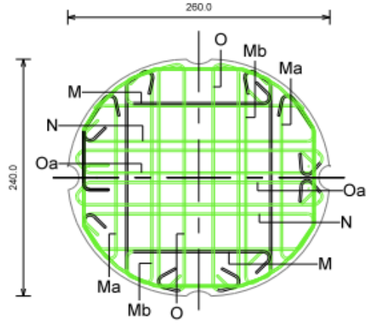
2 REFUERZO CORTE 3-3 #5
1 : 50



3 REFUERZO TRANSVERSAL #5
1 : 75



4 REFUERZO LONGITUDINAL #5
1 : 75



5 REFUERZO CORTE 4-4 #5
1 : 50

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MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

PRET

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

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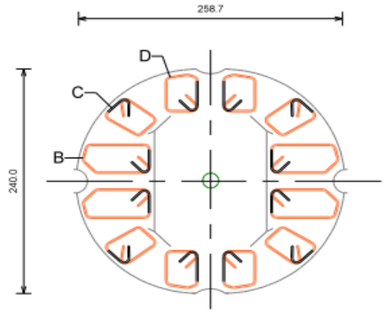
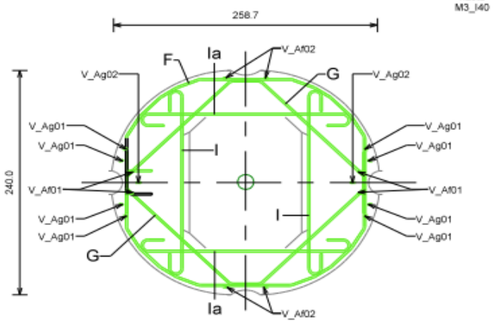
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

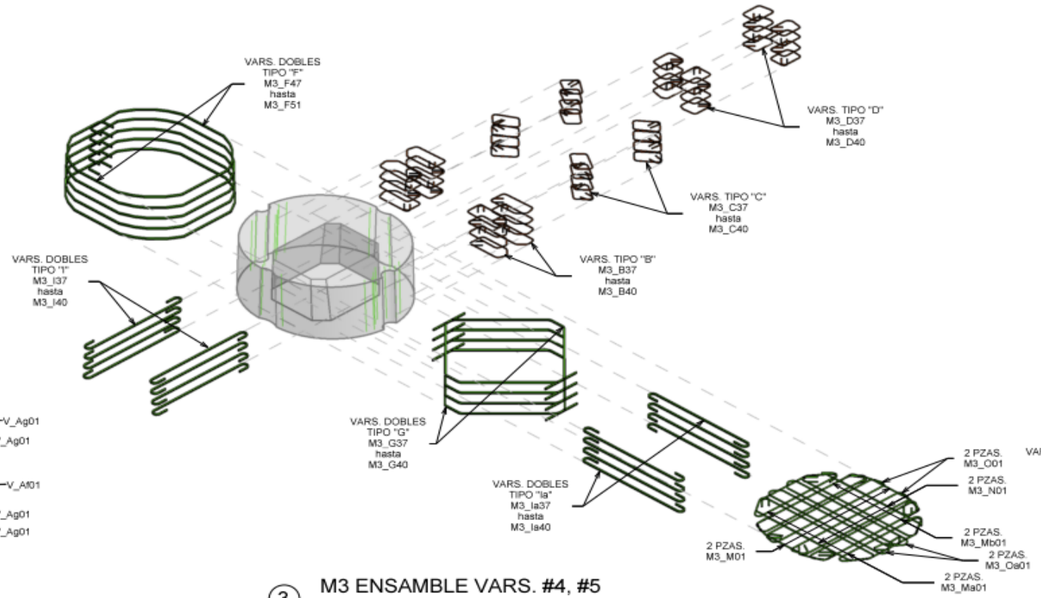
CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:



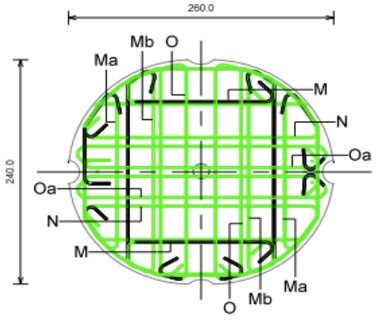
1 CORTE M3 VARS. #4
1 : 50



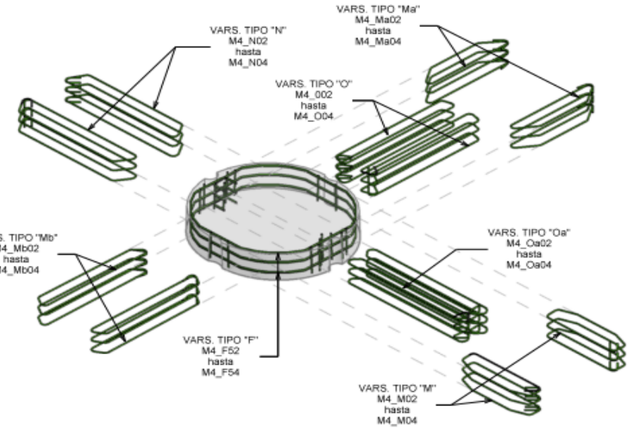
2 CORTE M3 VARS. #5
1 : 50



3 M3 ENSAMBLE VARS. #4, #5



4 CORTE M4 VARS. #5
1 : 50



5 M4 ENSAMBLE VARS. #5

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MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

PRET

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:		FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50	COTAS: CM	02/09/14

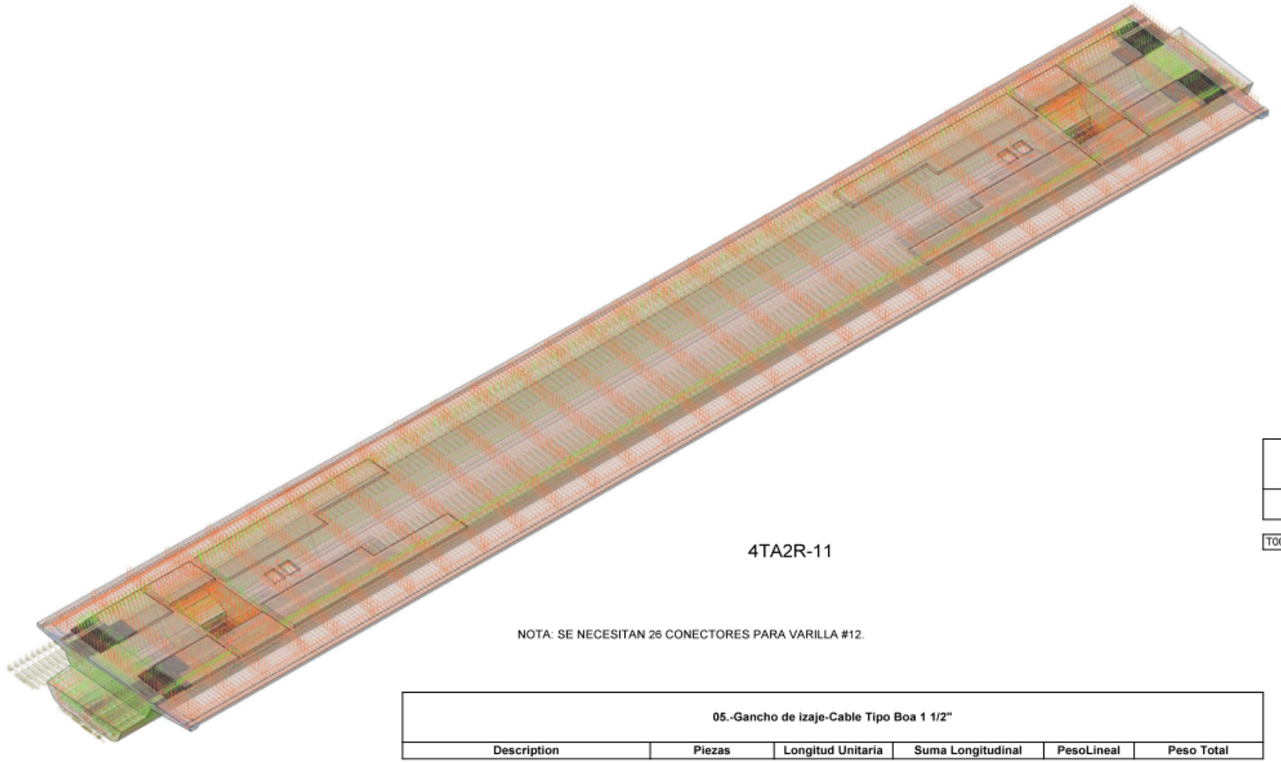
ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:



4TA2R-11

NOTA: SE NECESITAN 26 CONECTORES PARA VARILLA #12.

01_Volumen Geometrico

Pertenece a	No Pieza	Volumen
Trabe	4TA2R-11_V1	106.101 m³

02_Acero de refuerzo fy=4200 kg/cm2

Model	Cantidad	Suma Longitudinal	Peso Lineal	Peso Total
#04	7301	20,506.21 m		20424.181 kg
#05	1790	7,000.39 m		10920.611 kg
#06	60	136.31 m		306.706 kg
#08	16	100.96 m		401.316 kg
#12	58	506.84 m		4530.096 kg
	9225	28,250.71 m		36582.911 kg

03_Toron fpu=19000 kg/cm2

Clave	Diametro (mm)	Cantidad	Longitud Unitaria	Suma Longitudinal	PesoLineal	Peso Total
T001	1.27	196	4625.00	9,065.00 m	0.820 kg/m	7433.300 kg
		196		9,065.00 m		7433.300 kg

05.-Gancho de izaje-Cable Tipo Boa 1 1/2"

Description	Piezas	Longitud Unitaria	Suma Longitudinal	PesoLineal	Peso Total
Cable de 1 1/2" Tipo Boa	4.00	3.42 m	54.74 m	6.190 kg/m	338.836 kg
			54.74 m		338.836 kg

04_Poliducto para engrase

Clave	Cantidad	Description	Longitud Unitaria	Longitud Total
Toron N.1	128	Poliducto de PVC de 3/4" (19mm)	50.00 cm	6400.00 cm
Toron N.2	44	Poliducto de PVC de 3/4" (19mm)	100.00 cm	4400.00 cm
Toron N.3	64	Poliducto de PVC de 3/4" (19mm)	150.00 cm	9600.00 cm
Toron N.4	44	Poliducto de PVC de 3/4" (19mm)	700.00 cm	30800.00 cm
Toron N.5	16	Poliducto de PVC de 3/4" (19mm)	800.00 cm	12800.00 cm
Toron N.6	48	Poliducto de PVC de 3/4" (19mm)	1200.00 cm	57600.00 cm
	344			121600.00 cm

ICA bim

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS

PREFABRICADOS Y TRANSPORTES S.A. DE C.V.

BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

PRET

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	ESCALA:	COTAS:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m		1 : 50	CM	02/09/14

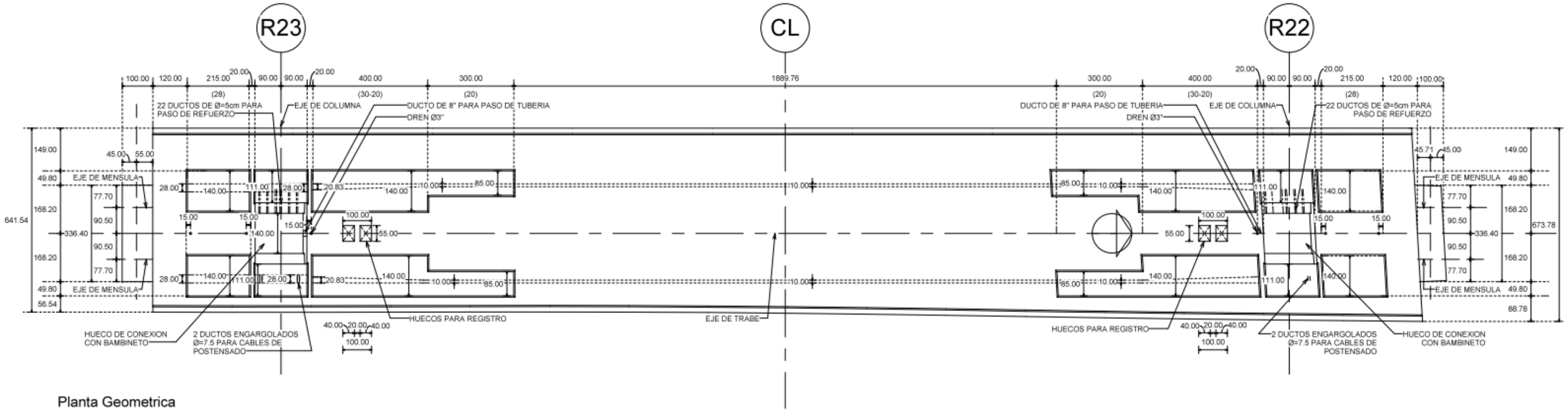
ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:



Planta Geometrica

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 COTAS: CM	02/09/14

ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

VPE-PGE-F5-CUPRI-III-048-P-00
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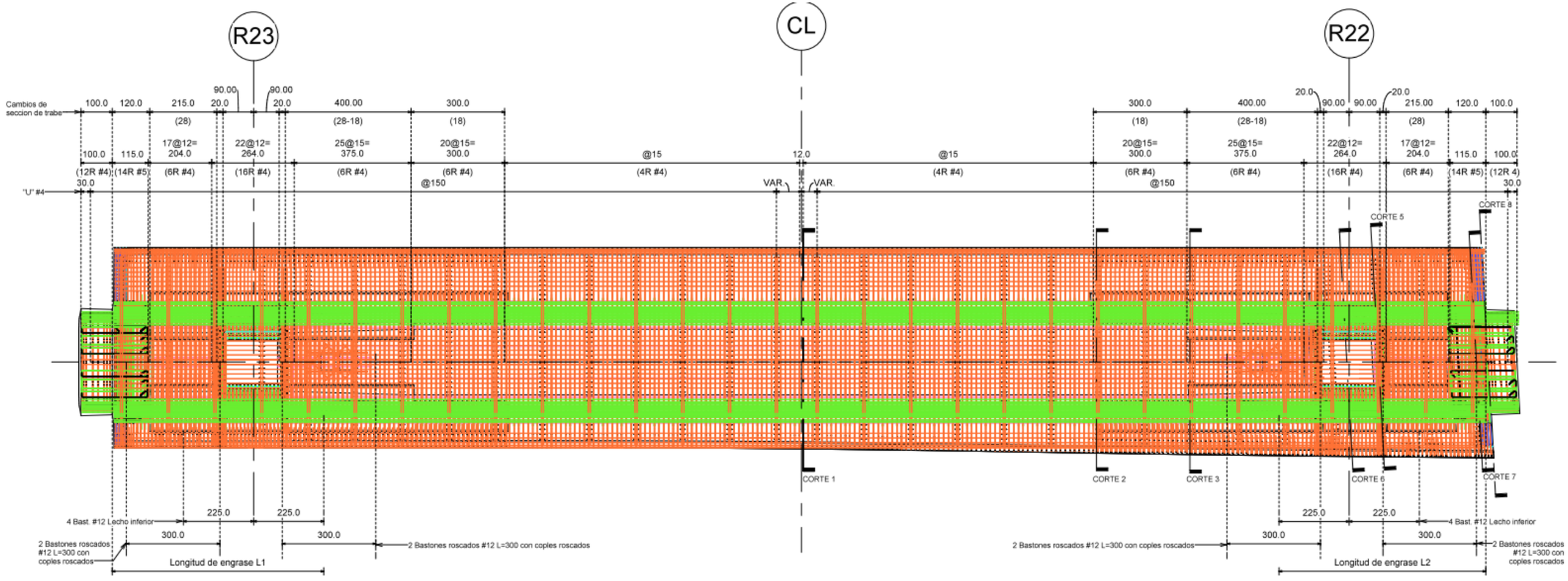
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:



Planta de Refuerzo

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
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BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 / COTAS: CM	02/09/14

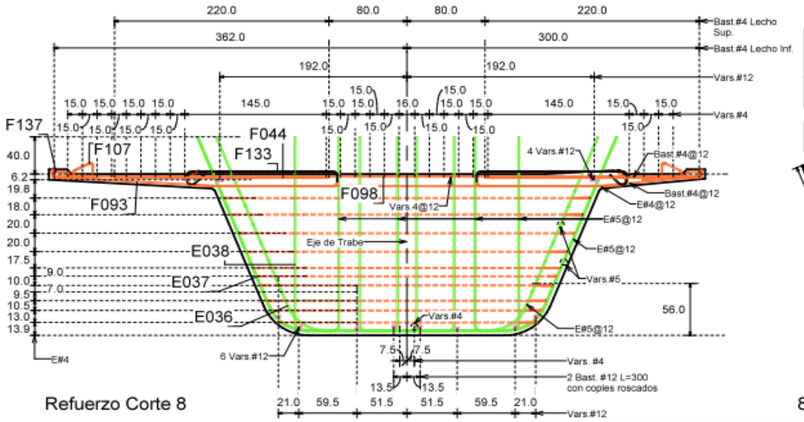
ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

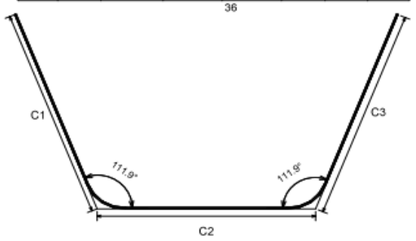
CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:



Refuerzo Corte 8

1.Acero Corte 8_E036,E037

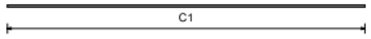
Clave	No. de Varilla	Sub-Zona	Longitud Unitaria	Cantidad	C1	C2	C3
E036	#05	Corte 8	660.97	12	197.16	166.08	197.16
E037	#05	Corte 8	699.34	24	197.16	204.45	197.16
				36			



8_E036,E037

1.Acero Corte 8_F-037,F044

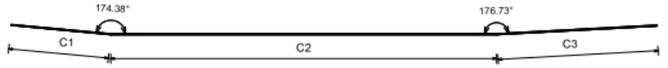
Clave	No. de Varilla	Sub-Zona	Longitud Unitaria	Cantidad	B
F037	#04	Corte 8	190.00	6	190.00
F044	#04	Corte 8	220.00	18	220.00
				24	



8_F-037,F044

1.Acero Corte 8_F-092,F093

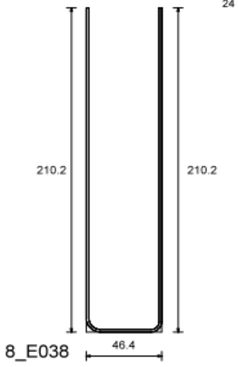
Clave	No. de Varilla	Sub-Zona	Longitud Unitaria	Cantidad	A	B	E
F092	#04	Corte 8	634.45	6	164.36	395.83	74.35
F093	#04	Corte 8	662.76	6	164.36	395.83	102.66
				12			



8_F-092,F093

1.Acero Corte 8_E038

Clave	No. de Varilla	Sub-Zona	Longitud Unitaria	Cantidad
E038	#05	Corte 8	457.58	24
				24



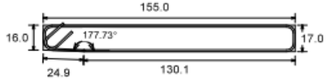
8_E038

1.Acero Corte 8

Clave	No. de Varilla	Sub-Zona	Longitud Unitaria	Cantidad
F037	#04	Corte 8	190.00	6
F044	#04	Corte 8	220.00	18
F092	#04	Corte 8	634.45	6
F093	#04	Corte 8	662.76	6
F098	#04	Corte 8	673.32	6
F100	#04	Corte 8	644.50	6
F133	#04	Corte 8	369.64	24
E025	#05	Corte 8	452.32	24
E036	#05	Corte 8	660.97	12
E037	#05	Corte 8	699.34	24
E038	#05	Corte 8	457.58	24
				156

1.Acero Corte 8_F-133

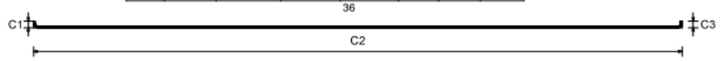
Clave	No. de Varilla	Sub-Zona	Longitud Unitaria	Cantidad
F133	#04	Corte 8	369.64	24
				24



8_F-133

1.Acero Corte 8_F-098-F100, E025

Clave	No. de Varilla	Sub-Zona	Longitud Unitaria	Cantidad	C1	C2	C3
F098	#04	Corte 8	673.32	6	7.20	665.27	7.20
F100	#04	Corte 8	644.50	6	7.20	636.45	7.20
E025	#05	Corte 8	452.32	24	210.20	40.10	210.20
				36			



8_F-098-F100, E025

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

INGENIEROS CIVILES ASOCIADOS
PREFABRICADOS Y TRANSPORTES S.A. DE C.V.
BUILDING INFORMATION MODELING

ARCO SUR INTERTRAMO 5

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	FECHA:
CAPITEL_B6	ECP01	GEOMETRIA	B6_8.50m	ESCALA: 1 : 50 COTAS: CM	02/09/14

ESPECIFICACIONES GENERALES:

PLANOS DE REFERENCIA:

VPE-PGE-F5-CUPRI-III-048-P-00
VPE-EST-F5-CUPRI-III-013-P-00 (05CZ6B11_G1 DE 2)
VPE-EST-F5-CUPRI-III-014-P-00 (05CZ6B11_G2 DE 2)
VPE-EST-F5-CUPRI-III-015-P-01 (05CZ6B11_R1 DE 3)
VPE-EST-F5-CUPRI-III-016-P-01 (05CZ6B11_R2 DE 3)
VPE-EST-F5-CUPRI-III-017-P-01 (05CZ6B11_R3 DE 3)

MATERIALES:

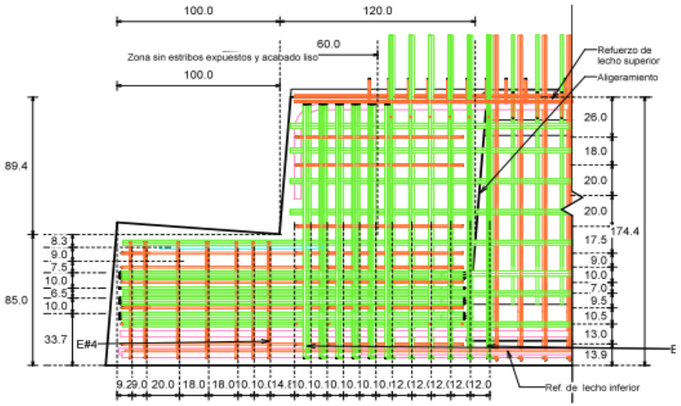
CONCRETO F'c= 600 kg/cm2
EDAD=
AGREGADO MAX. = 1/2" (1.27cm)
ACERO DE REFUERZO Fy= 4200 Kg/cm2
ACERO EN PLACAS, ACCESORIOS METALICOS Y TENSORES Fy= 2530kg/cm2
ACERO DE PRESFUERZO Fy= 19000kg/cm2 (torones de 3/8")
ACERO ESTRUCTURAL = A-50
POLIESTIRENO:

1.Acero Estribos Planta

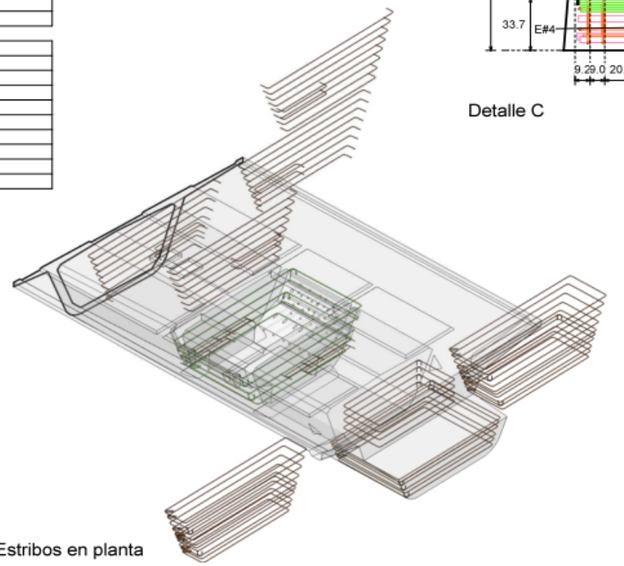
Clave	No. de Varilla	Sub-Zona	Longitud Unitaria	Cantidad
F010	#04	Corte EP	687.19	1
F011	#04	Corte EP	700.79	3
F012	#04	Corte EP	708.09	1
F013	#04	Corte EP	724.98	1
F014	#04	Corte EP	751.51	1
F015	#04	Corte EP	767.19	1
F016	#04	Corte EP	767.59	1
F017	#04	Corte EP	782.06	1
F018	#04	Corte EP	788.09	1
F019	#04	Corte EP	804.98	1
F020	#04	Corte EP	810.20	1
F021	#04	Corte EP	831.51	1
F022	#04	Corte EP	847.59	1
F023	#04	Corte EP	862.06	1
F024	#04	Corte EP	874.53	1
F025	#04	Corte EP	890.20	1
F026	#04	Corte EP	903.47	1
F027	#04	Corte EP	954.53	1
F028	#04	Corte EP	981.52	1
F029	#04	Corte EP	983.47	1
F030	#04	Corte EP	1002.42	1
F031	#04	Corte EP	1019.30	1
F032	#04	Corte EP	1045.84	1
F033	#04	Corte EP	1061.92	1
F034	#04	Corte EP	1076.39	1
F155	#04	Corte EP	709.38	4
F156	#04	Corte EP	725.58	1
F157	#04	Corte EP	796.81	1
F158	#04	Corte EP	843.16	1
F159	#04	Corte EP	856.40	1
F160	#04	Corte EP	931.30	1
F161	#04	Corte EP	963.87	1
F162	#04	Corte EP	1001.72	1
F163	#04	Corte EP	1028.30	1
F164	#04	Corte EP	1044.40	1
F165	#04	Corte EP	1058.90	1
F166	#04	Corte EP	687.21	1
F167	#04	Corte EP	708.15	1
F168	#04	Corte EP	751.64	1
F169	#04	Corte EP	767.74	1
F170	#04	Corte EP	775.35	1
F171	#04	Corte EP	782.24	1
F172	#04	Corte EP	810.42	1
F173	#04	Corte EP	813.20	1
F174	#04	Corte EP	839.78	1
F175	#04	Corte EP	870.38	1
F176	#04	Corte EP	874.85	1
F177	#04	Corte EP	898.56	1
F178	#04	Corte EP	903.84	1
F179	#04	Corte EP	962.99	1
F180	#04	Corte EP	984.29	1
F181	#04	Corte EP	991.98	1
F207	#04	Corte EP	135.65	4
F208	#04	Corte EP	135.81	4

1.Acero Estribos Planta

Clave	No. de Varilla	Sub-Zona	Longitud Unitaria	Cantidad
F209	#04	Corte EP	169.07	8
F210	#04	Corte EP	169.28	16
F211	#04	Corte EP	308.40	4
F212	#04	Corte EP	308.83	4
F213	#04	Corte EP	324.48	4
F214	#04	Corte EP	324.94	3
F215	#04	Corte EP	325.17	1
F216	#04	Corte EP	342.17	4
F217	#04	Corte EP	342.66	4
F218	#04	Corte EP	358.25	4
F219	#04	Corte EP	358.76	4
F220	#04	Corte EP	374.33	4
F221	#04	Corte EP	374.87	4
F222	#04	Corte EP	390.41	4
F223	#04	Corte EP	390.98	4
F224	#04	Corte EP	406.49	4
F225	#04	Corte EP	407.08	4
F226	#04	Corte EP	422.57	4
F227	#04	Corte EP	423.19	4
E003	#05	Corte EP	984.16	1
E004	#05	Corte EP	1059.42	1
E005	#05	Corte EP	1093.35	1
E006	#05	Corte EP	1134.52	1
E007	#05	Corte EP	1175.68	1
E030	#05	Corte EP	1060.68	1
E031	#05	Corte EP	1094.67	1
E032	#05	Corte EP	1135.90	1
E033	#05	Corte EP	1177.13	1
E035	#05	Corte EP	984.65	1
				163



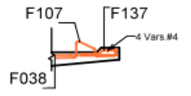
Detalle C



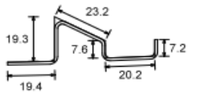
Estribos en planta

1.Acero Corte DB

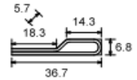
Clave	No. de Varilla	Sub-Zona	Longitud Unitaria	Cantidad
F107	#04	Corte DB	91.02	626
F137	#04	Corte DB	77.00	626
				1252



Refuerzo Remate Alero



F107



F137

ELABORÓ:	REVISÓ Y APROBÓ:	REVISÓ Y APROBÓ:
Arq. Aarón De Marcos Estévez	Ing. David Muñoz Vizuet	Ing. Fernando Mendez Galicia
MODELADOR	INGENIERIA	SUPERINTENDENTE

ICA

INGENIEROS CIVILES ASOCIADOS

BUILDING INFORMATION MODELING

PRET

CORREDOR NORTE PANAMÁ - VILLALOBOS RAMPA 42

ELEMENTO:	HOJA:	CROQUIS:	PIEZA A FABRICAR:	PLANO DE REFERENCIA:	ESCALA:	COTAS:	FECHA:
VLR_BI-48	2/3	ACERO	VLR_BI-48	CN-TR-VLR-ES-04	S/E	CM	19 DE MARZO DE 2013

ESPECIFICACIONES GENERALES:

CONCRETO:
Clase D, según especificaciones del M.O.P.
Resistencia cilíndrica a la compresión al momento de transferencia = 385.612 kg/cm2 (5,200 p.s.i.) Resistencia cilíndrica a la compresión a los 28 días = 457.015 kg/cm2 (6,500 p.s.i.).
Tamaño máximo del agregado grueso = 0.013 m

ACERO DE REFUERZO:
El acero de refuerzo se ajustará a los requisitos de las especificaciones A.S.T.M. A615, para barras deformadas grado 42. El acero de refuerzo tendrá una resistencia a la cedencia de 4,218 kg/cm2 (60,000 p.s.i.) obtenida mediante una adecuada composición química del acero tal como lo establece el A.S.T.M. A615 (A.A.S.H.T.O. M31). No se permitirán los aceros endurecidos por deformación en frío.

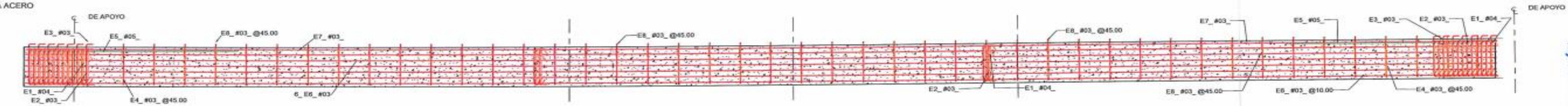
ACERO DE PRESFUERZO:
Se ajustará a los requisitos de las especificaciones A.S.T.M. A416 (A.A.S.H.T.O M203) y será del grado 270

NOTAS GENERALES:

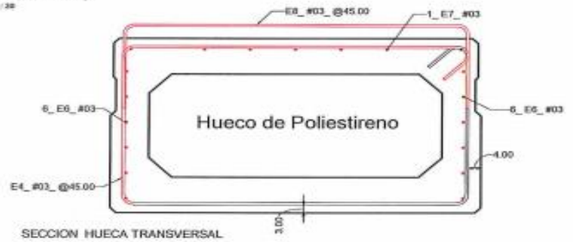
El tensado de los cables sólo se podrá iniciar después que se haya inspeccionado su colocación y la armadura pasiva. Antes de iniciar cualquier tensado, el Contratista debe presentar el cálculo de las pérdidas para su confrontación con las pérdidas asumidas en el diseño. A todos los Cables, Torones o Alambrones se le aplicará una tensión máxima de 0.75 fpu. Las Vigalosas pretensadas se instalarán sobre sus apoyos, ubicados en los Estribos, tal como se indica en el Plano. Todas las aristas vistas se achaflanarán 0.02m.

Piezas a Fabricar: 8

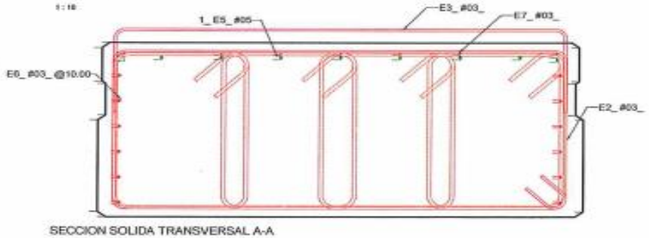
PLANTA ACERO
1 : 30



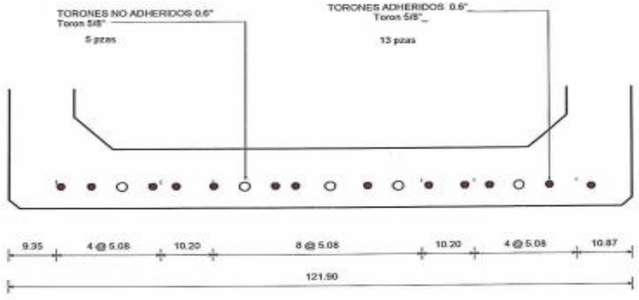
DISPOSICION DE LA ARMADURA (VISTA LONGITUDINAL)
1 : 30



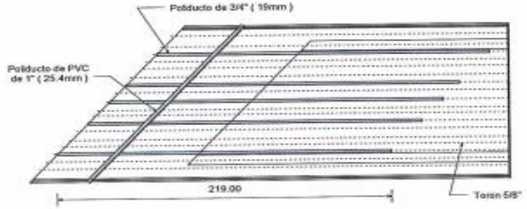
SECCION HUECA TRANSVERSAL
1 : 10



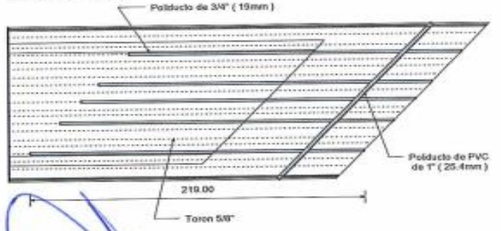
SECCION SOLIDA TRANSVERSAL A-A
1 : 10



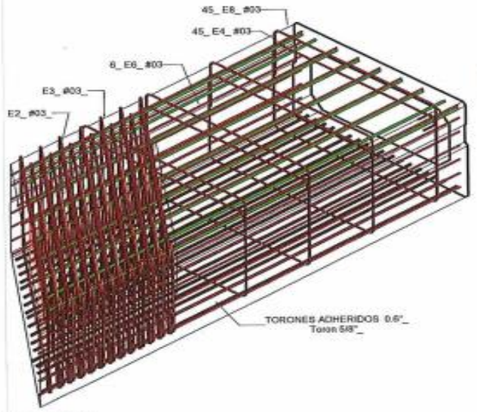
SECCION TRANSVERSAL A-A (TORONES)
1 : 6



DETALLE TORONES



DETALLE _TORONES

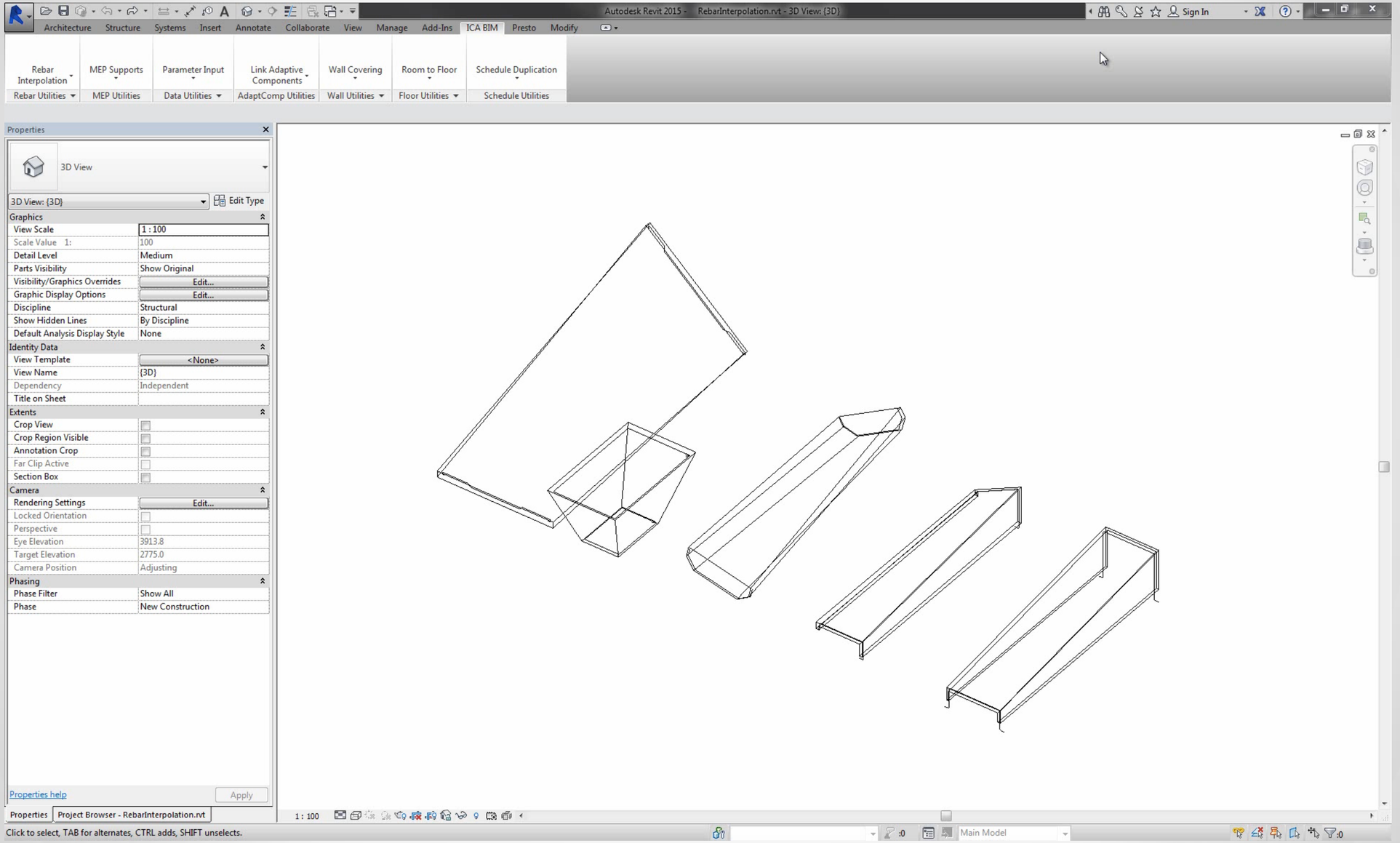


DETALLE ARMADO

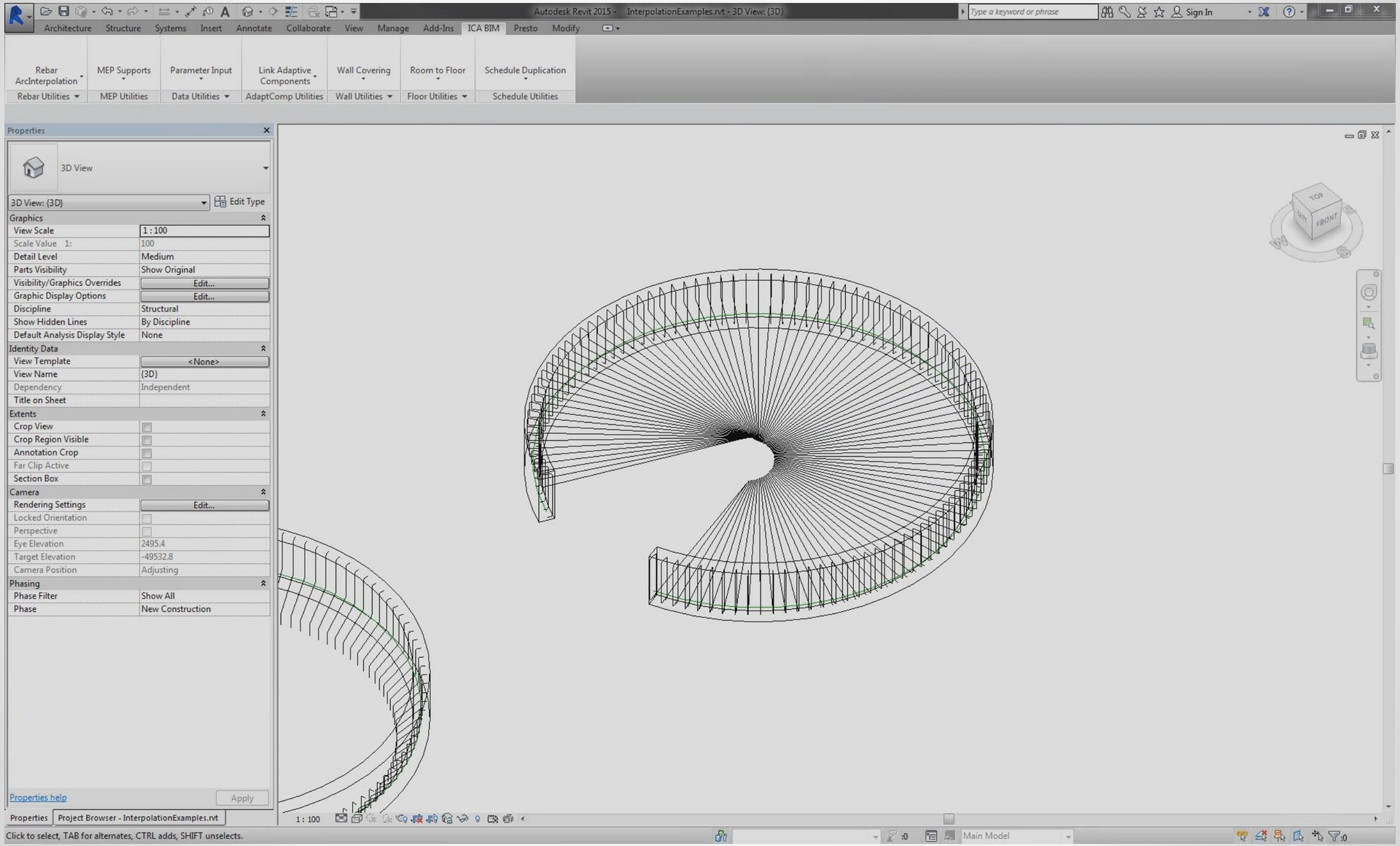
ELABORÓ:	REVISÓ:	VISTO BUENO:	VISTO BUENO:	AUTORIZÓ PARA SU EJECUCIÓN:	AUTORIZÓ PARA SU EJECUCIÓN:
Arq. Alejandro Ortega Anaya JEFE DE FRENTE	Ing. José Fco. Tello Hamvacuan JEFE DE OBRA	Ing. Carlos A. Jaén Robledo SUPERINTENDENTE	Ing. Ulises Mexicano Cruz JEFE DE OBRA ESTRUCTURAS ICAPSA	Ing. Carlos A. Valdez Godinez INGENIERIA ICAPSA	Ing. Carles Barredes Esquer GERENTE DE PROYECTO

SISTEMA DE GESTIÓN DOCUMENTAL

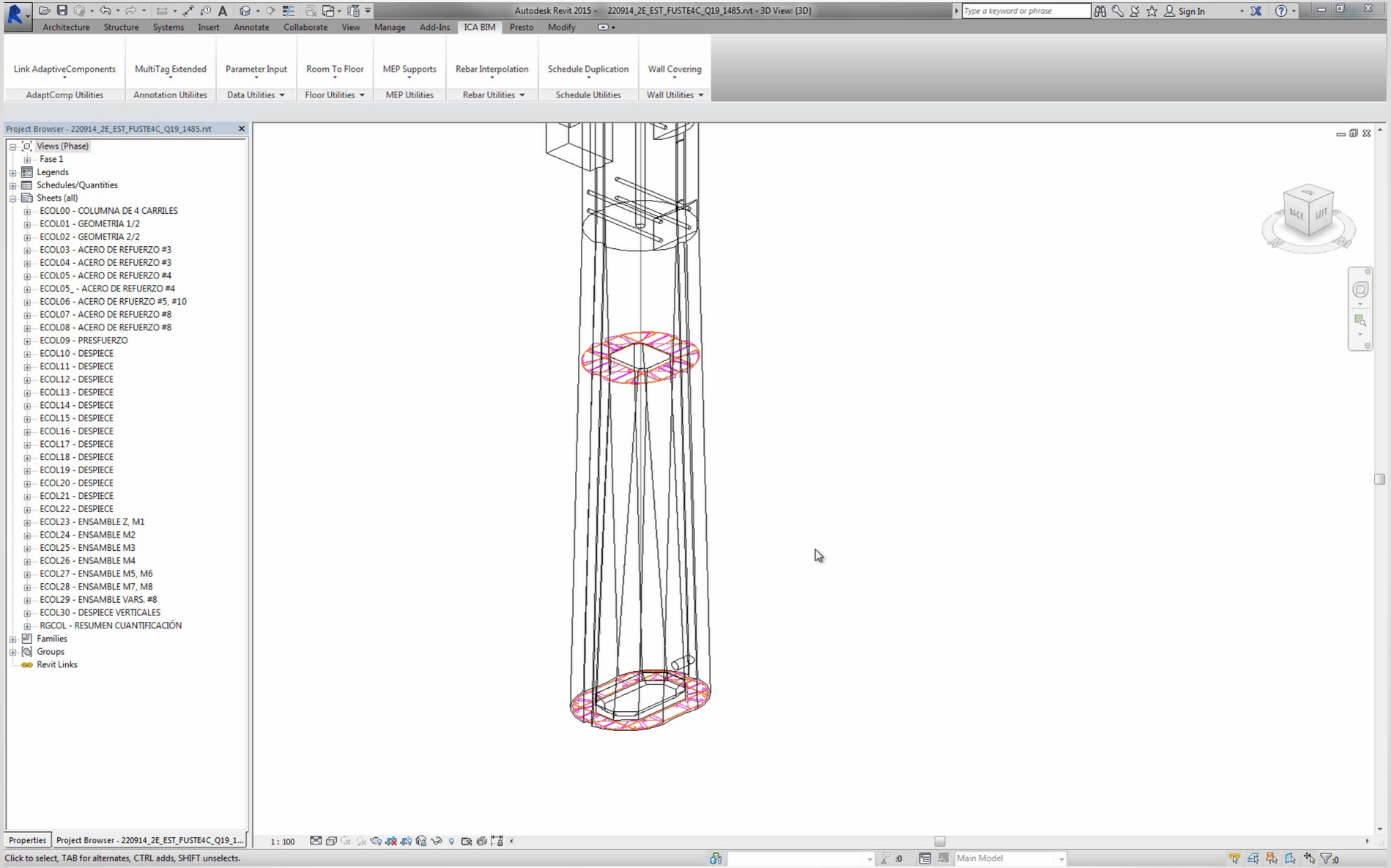
Rebar Interpolation App

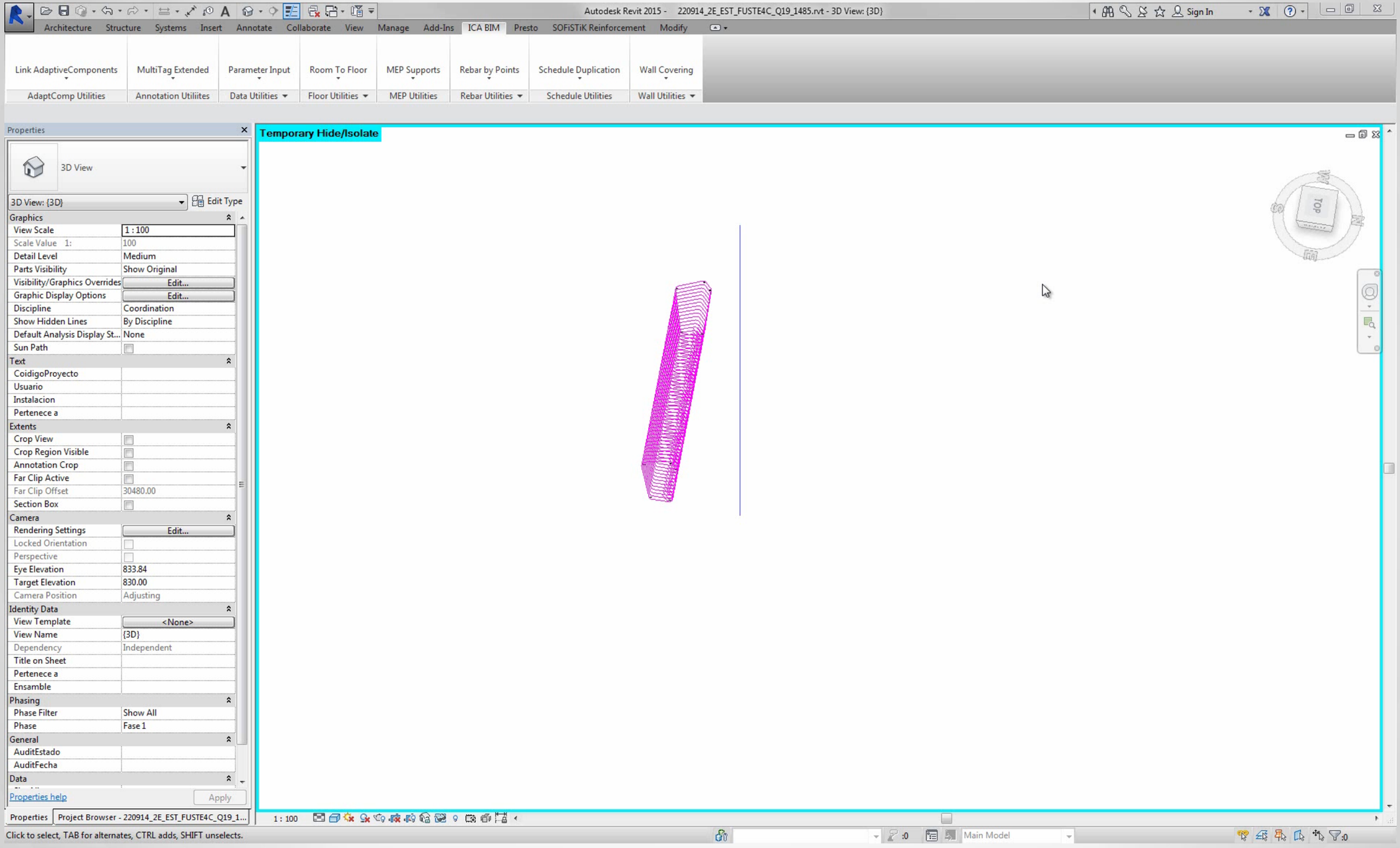


Rebar Arc Interpolation App

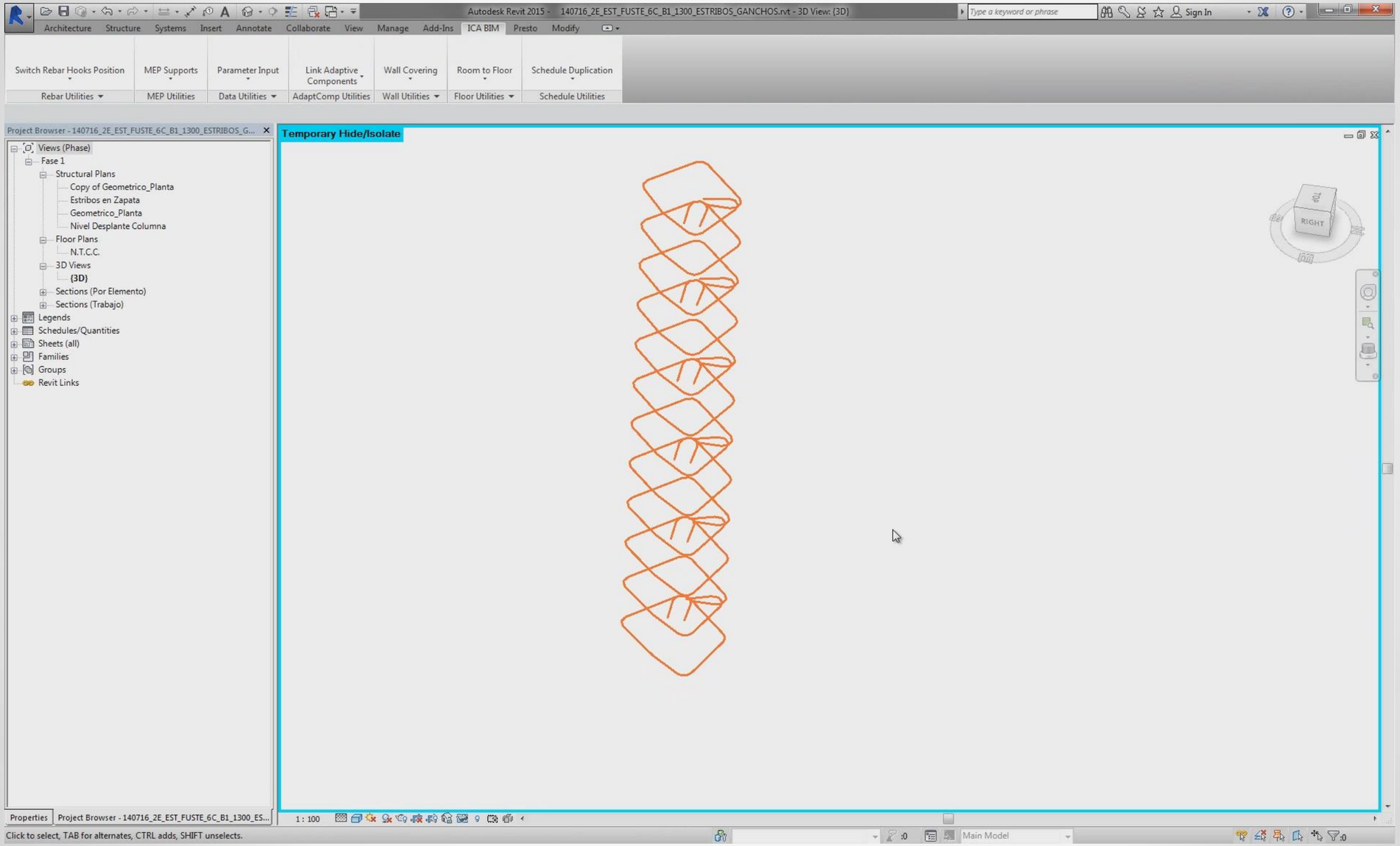


Rebar Interpolation App

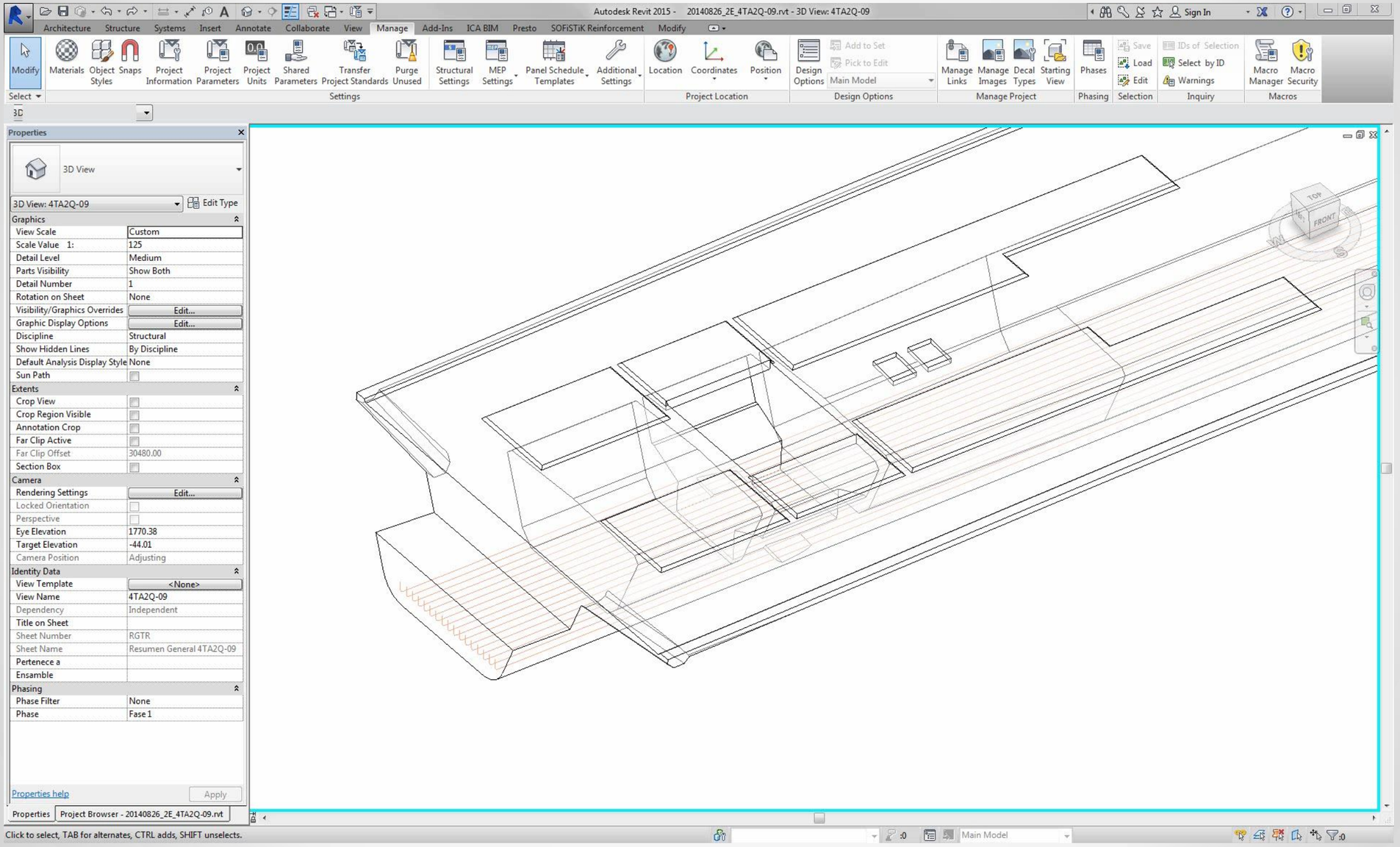



Autodesk Revit 2015 - 220914_2E_EST_FUSTE4C_Q19_1485.rvt - 3D View: {3D}
Sign In
Architecture
Structure
Systems
Insert
Annotate
Collaborate
View
Manage
Add-Ins
ICA BIM
Presto
SOFiSTiK Reinforcement
Modify
Link AdaptiveComponents
MultiTag Extended
Parameter Input
Room To Floor
MEP Supports
Rebar by Points
Schedule Duplication
Wall Covering
AdaptComp Utilities
Annotation Utilites
Data Utilities
Floor Utilities
MEP Utilities
Rebar Utilities
Schedule Utilities
Wall Utilities
Properties
3D View
3D View: {3D}
Edit Type
Graphics
View Scale 1 : 100
Scale Value 1: 100
Detail Level Medium
Parts Visibility Show Original
Visibility/Graphics Overrides Edit...
Graphic Display Options Edit...
Discipline Coordination
Show Hidden Lines By Discipline
Default Analysis Display St... None
Sun Path
Text
CoidigoProyecto
Usuario
Instalacion
Pertenece a
Extents
Crop View
Crop Region Visible
Annotation Crop
Far Clip Active
Far Clip Offset 30480.00
Section Box
Camera
Rendering Settings Edit...
Locked Orientation
Perspective
Eye Elevation 833.84
Target Elevation 830.00
Camera Position Adjusting
Identity Data
View Template <None>
View Name {3D}
Dependency Independent
Title on Sheet
Pertenece a
Ensamble
Phasing
Phase Filter Show All
Phase Fase 1
General
AuditEstado
AuditFecha
Data
Properties help
Apply
Properties
Project Browser - 220914_2E_EST_FUSTE4C_Q19_1...
Temporary Hide/Isolate
TOP
1 : 100
Main Model
Click to select, TAB for alternates, CTRL adds, SHIFT unselects.

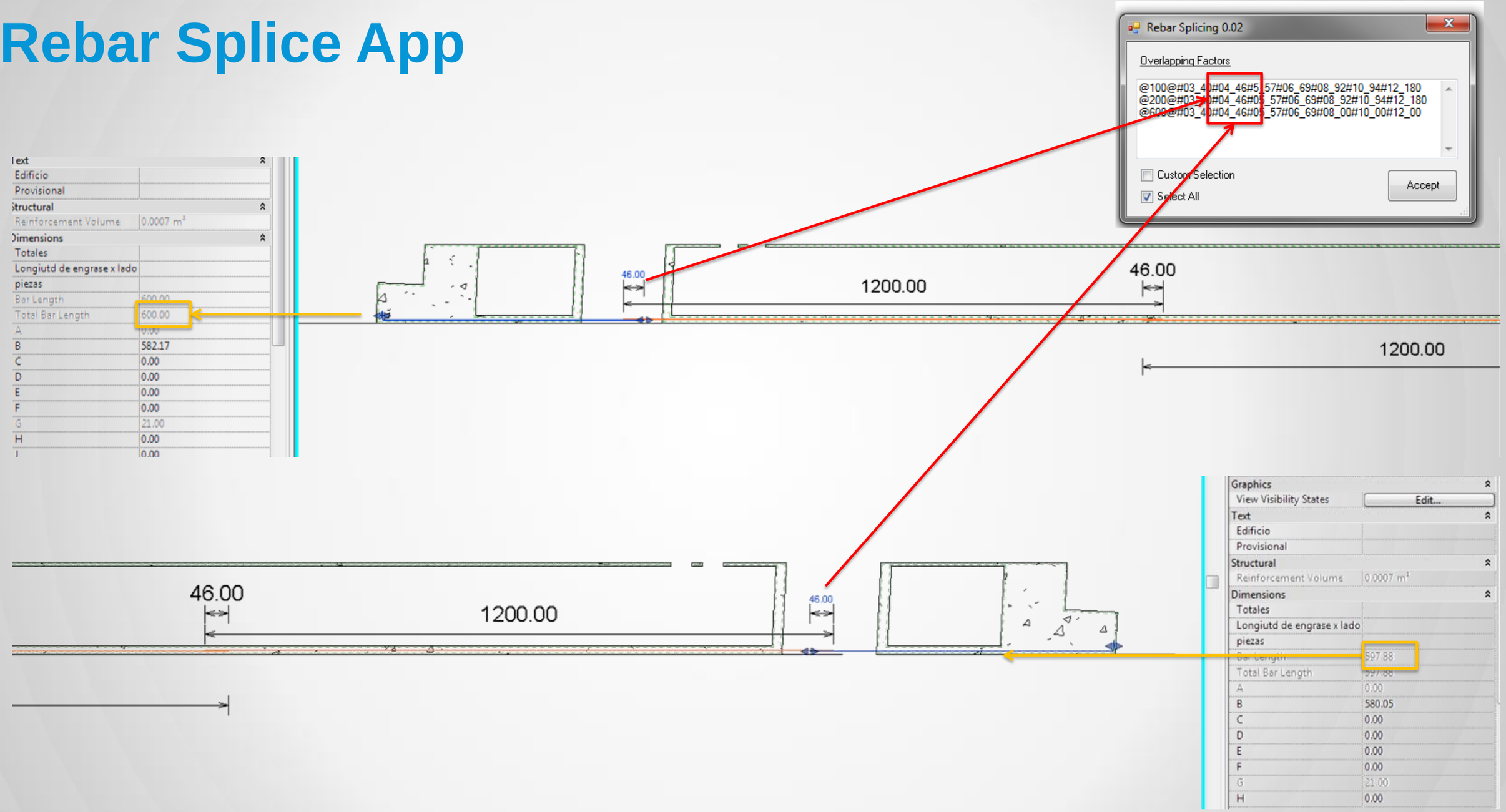
Change Rebar Hook Position App



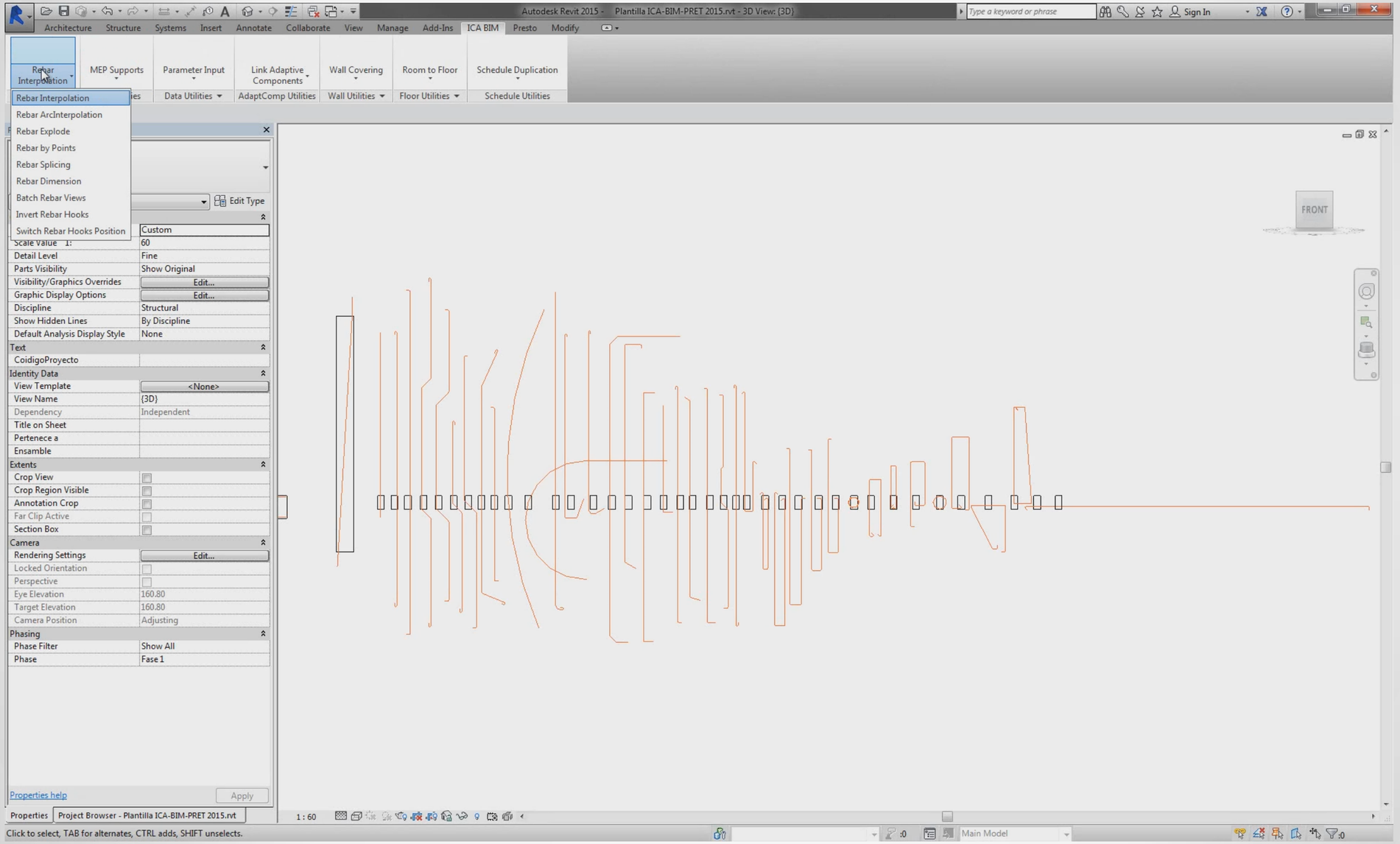
Rebar Splice App



Rebar Splice App



Rebar Splice App



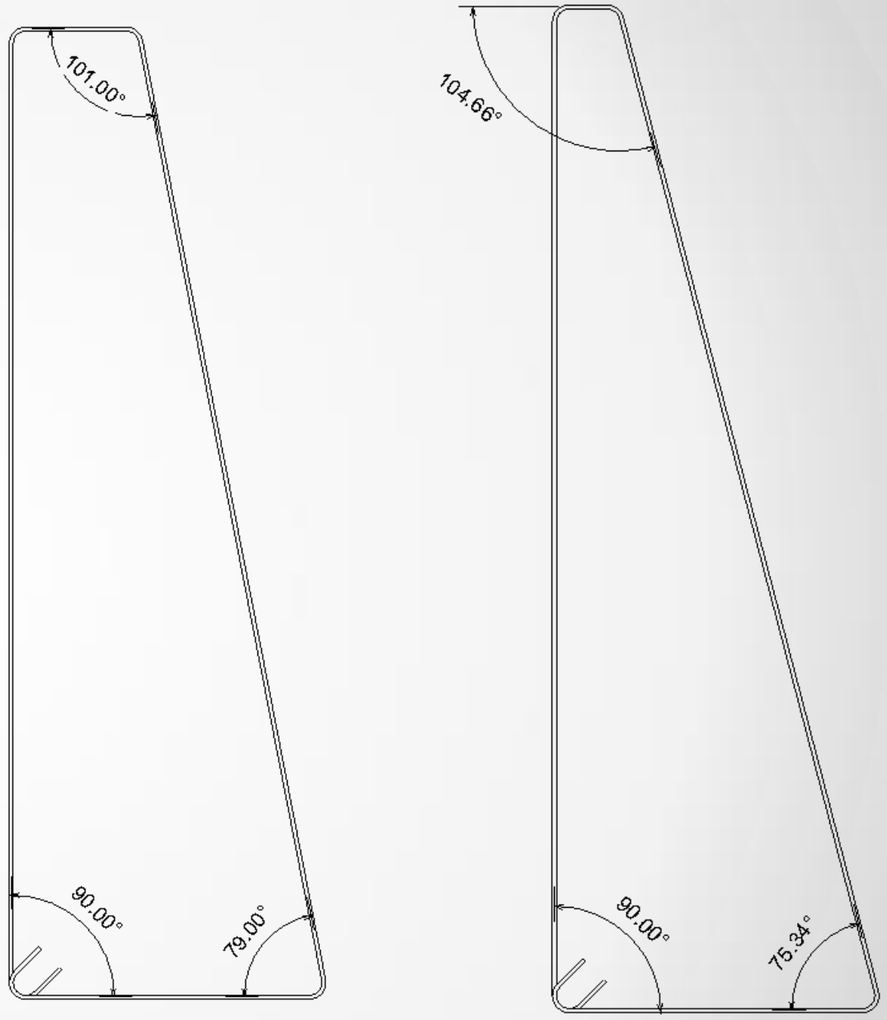
Tips and Tricks

Rebar Shapes

- When sketch a new rebar, Revit tries to match the segments and hooks with its internal library if didn't find a match it creates a new form.
- The rules for matching are:
  - Number of segments regardless of the dimension.
  - Angle relationship between contiguous segments
  - Hook Types and Hook Orientations
  - Style of rebar (Standard or Stirrup/Tie)

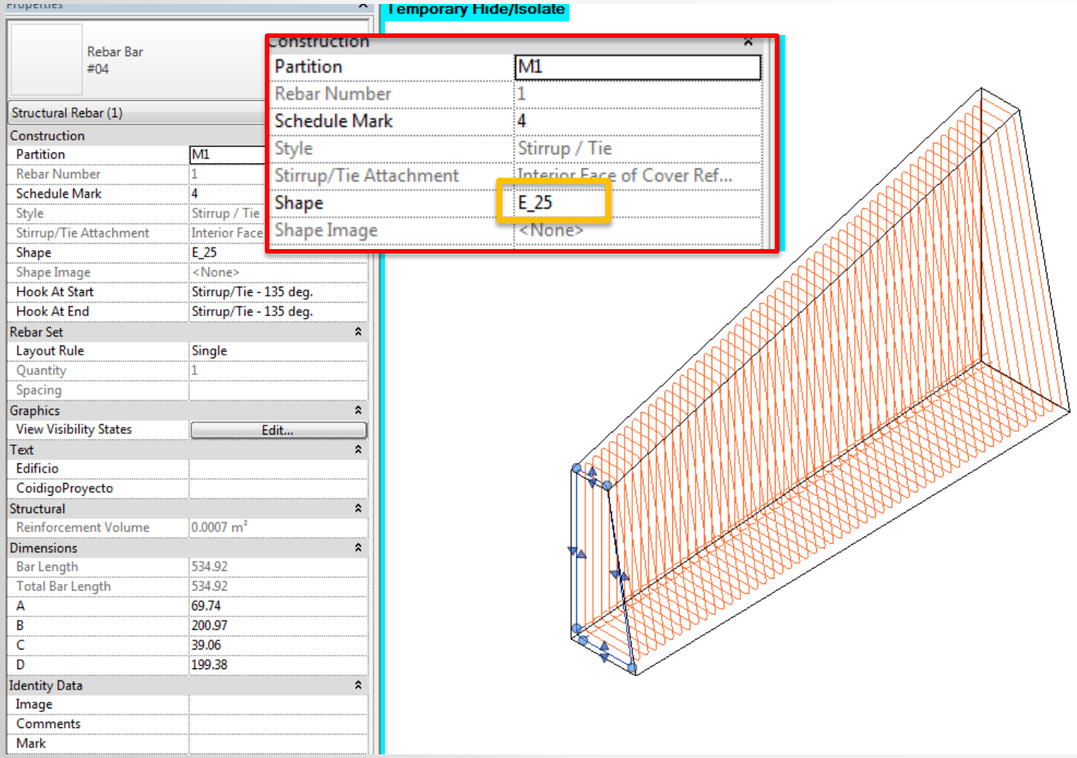
Rebar in Twisted Elements

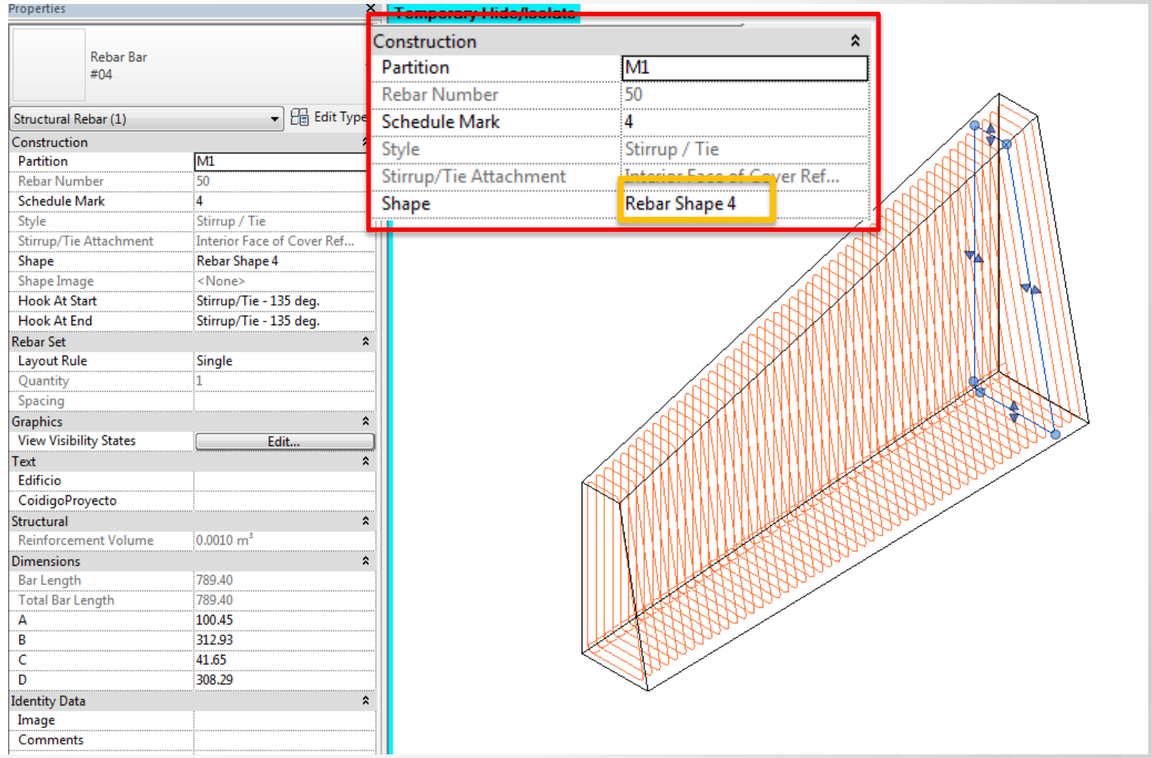
- If the element is twisted the rebar stirrups need to be adjusted along the section, this implies different angles.



Rebar in Twisted Elements

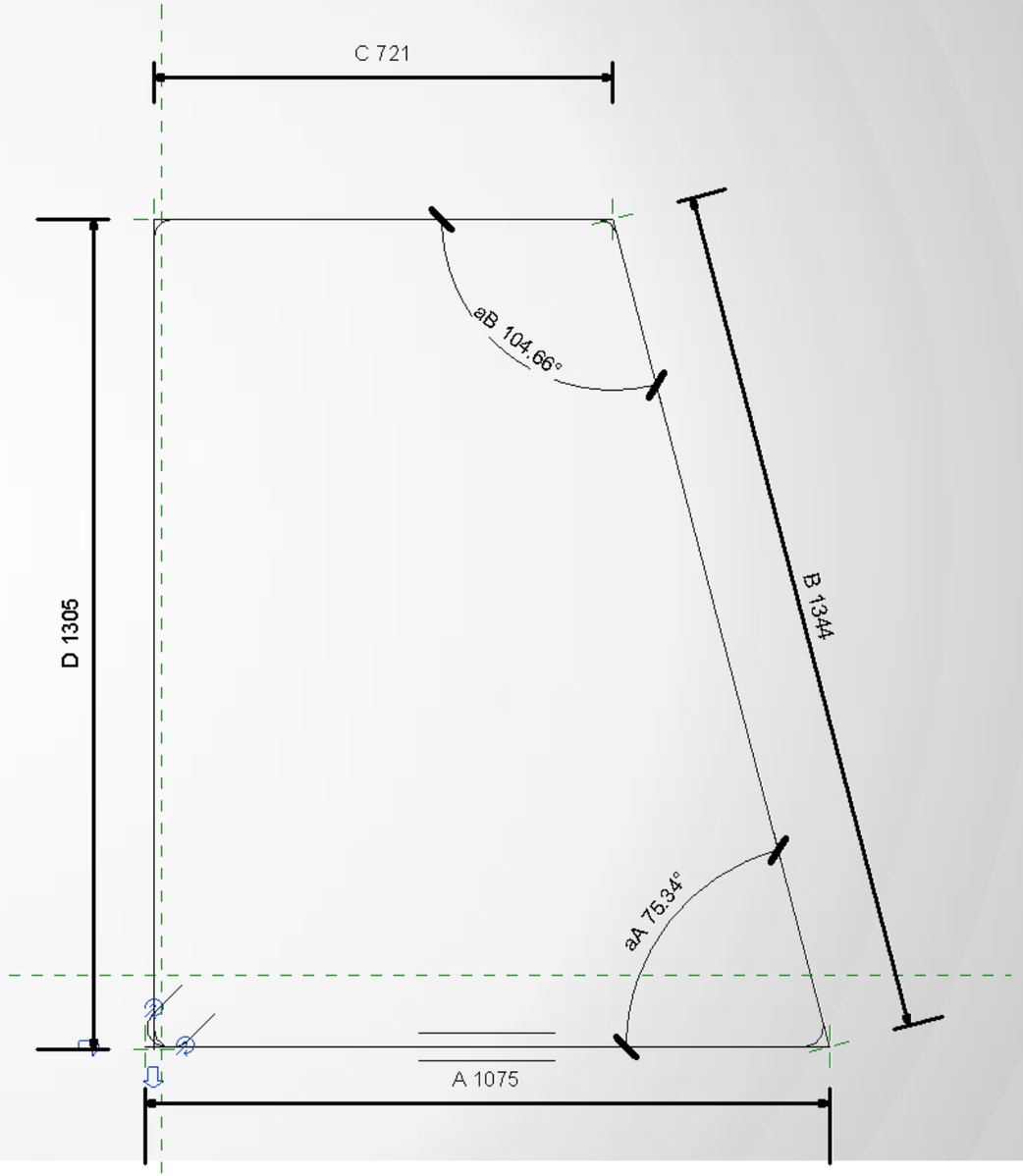
- The problem is that the model ends with a new shape for every stirrup.





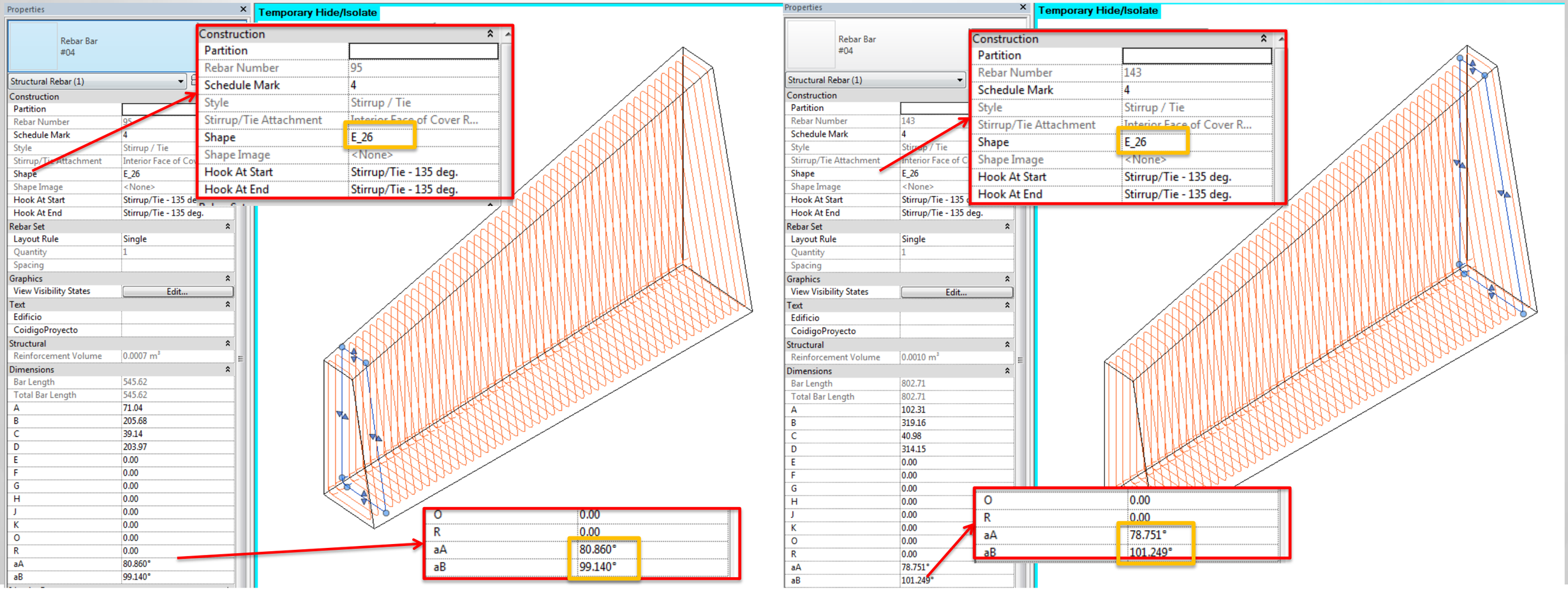
Rebar in Twisted Elements

- To solve this problem before modeling all rebars, select the rebar and click edit family inside the sketch dimension the angle between contiguous segments and assign a shared parameter

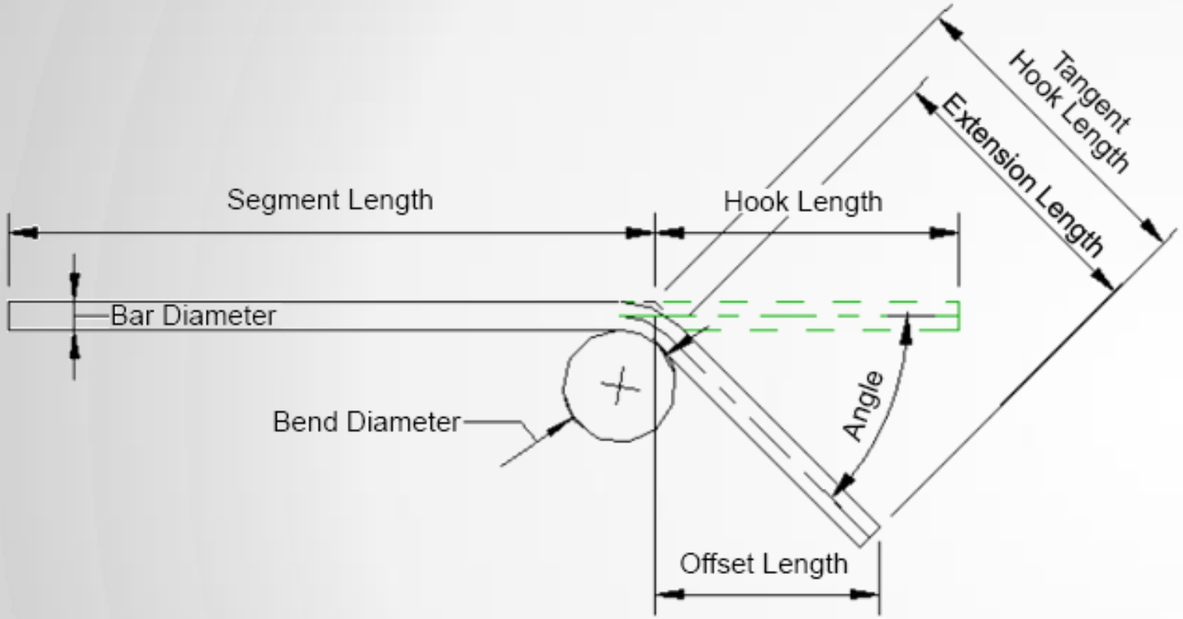


Rebar in Twisted Elements

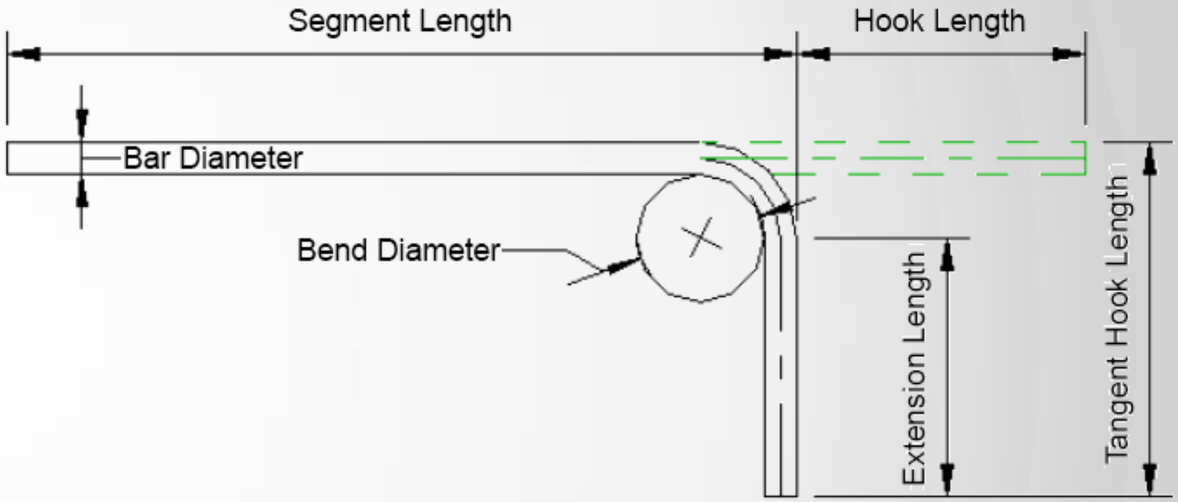
- The problem is resolved and every stirrup has the same shape although it has different angles



Hook Lengths



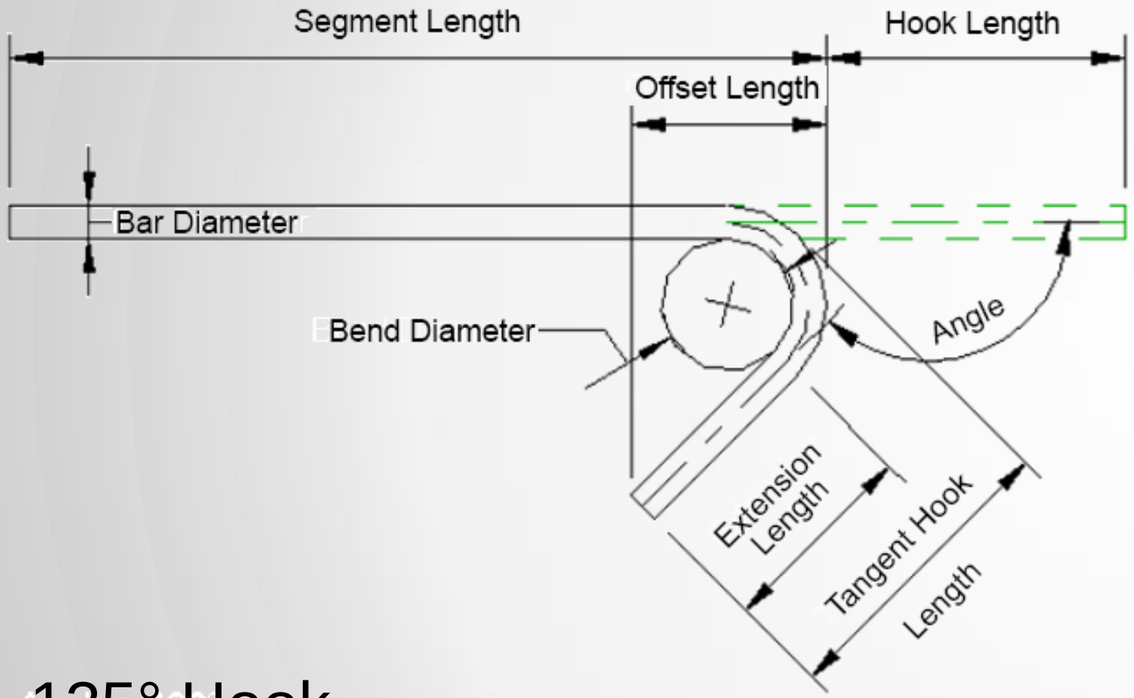
45° Hook



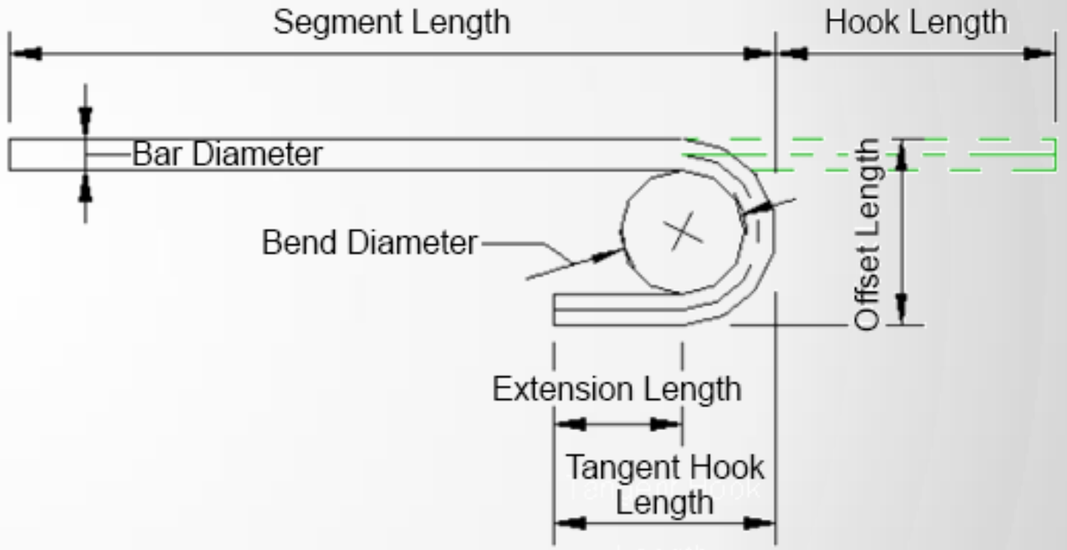
90° Hook

SOURCE Revit 2015 Help

Hook Lengths



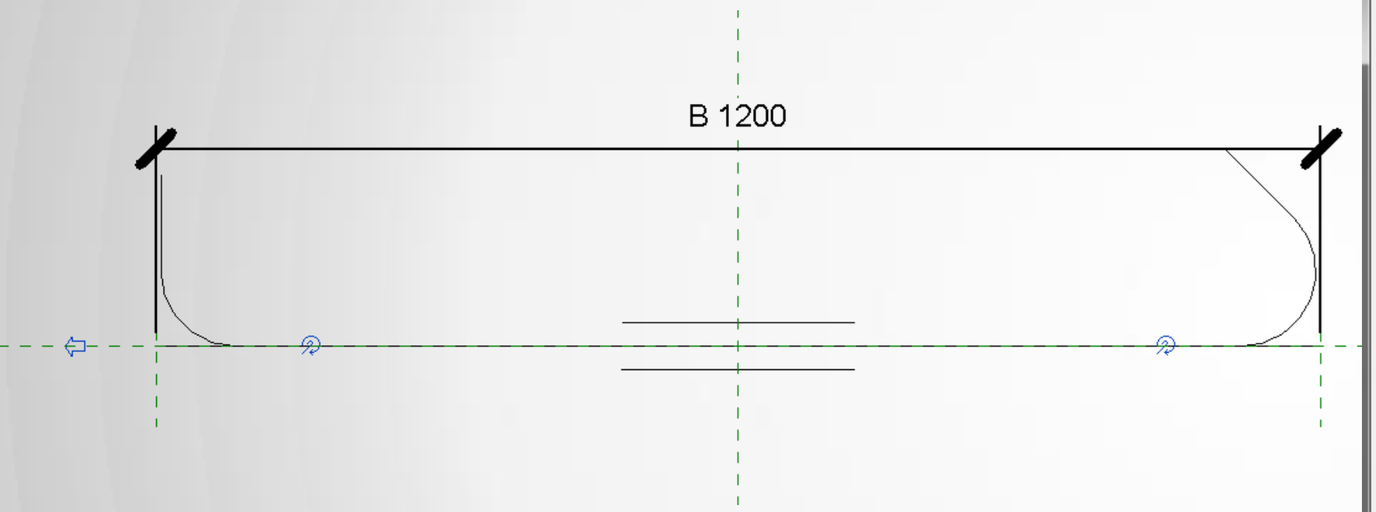
135° Hook



180° Hook

SOURCE Revit 2015 Help

Rebar Shape

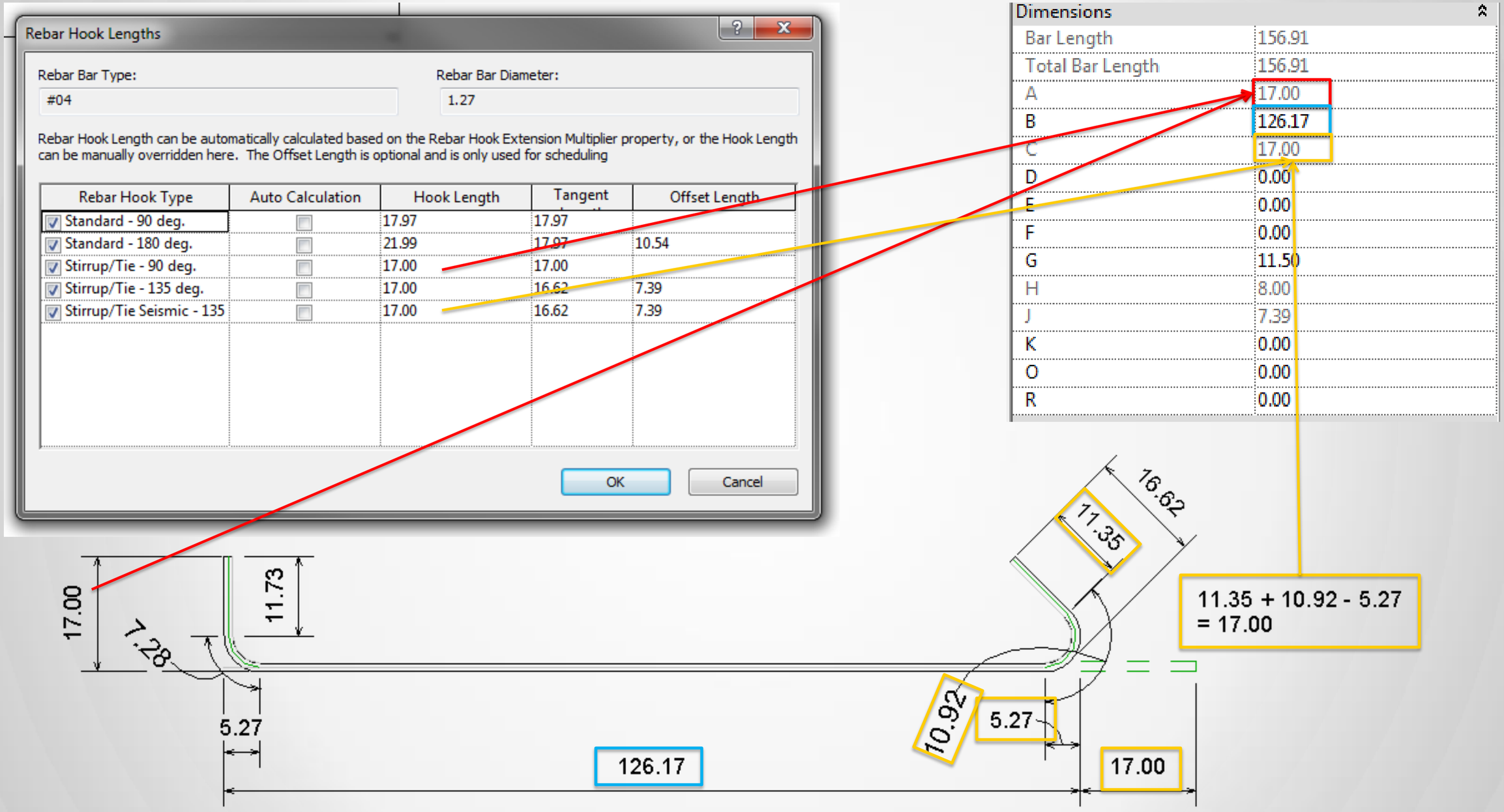


Rebar Shape Parameters

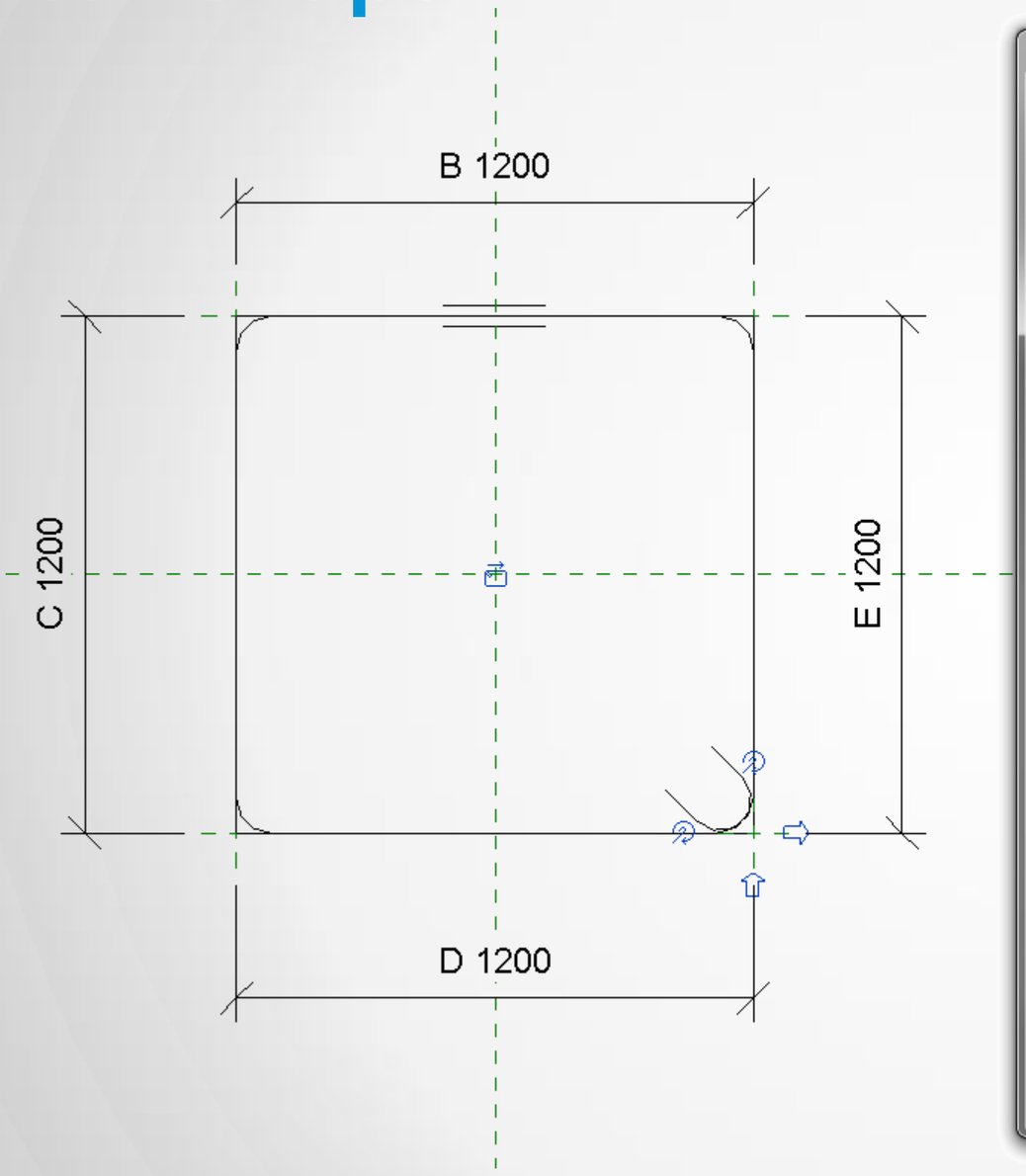
Parameter	Value	Formula
Construction		
Style	Stirrup / Tie	=
Stirrup/Tie Attachment	Interior Face of Co	=
Start Tangent Hook Length (default)	115.0 mm	=
Start Hook Offset Length (default)	80.0 mm	=
Start Hook Length (default)	115.0 mm	=
Shape Image	<None>	=
Hook At Start	135°	=
Hook At End	90°	=
End Tangent Hook Length (default)	115.0 mm	=
End Hook Offset Length (default)	80.0 mm	=
End Hook Length (default)	115.0 mm	=
Bend Diameter (default)	155.0 mm	=
Bar Diameter (default)	10.0 mm	=
Dimensions		
R (default)	0.0 mm	=
O (default)	0.0 mm	=
K (default)	0.0 mm	=
J (default)	80.0 mm	= End Hook Offset Length
H (default)	80.0 mm	= Start Hook Offset Length
G (default)	115.0 mm	=
F (default)	0.0 mm	=
E (default)	0.0 mm	=
D (default)	0.0 mm	=
C (default)	115.0 mm	= End Hook Length
B (default)	1200.0 mm	=
A (default)	115.0 mm	= Start Hook Length

Parameters: Add... | Modify... | Remove

OK | Cancel | Apply | Help


Rebar Hook Lengths
Rebar Bar Type:
#04
Rebar Bar Diameter:
1.27
Rebar Hook Length can be automatically calculated based on the Rebar Hook Extension Multiplier property, or the Hook Length can be manually overridden here. The Offset Length is optional and is only used for scheduling
Rebar Hook Type | Auto Calculation | Hook Length | Tangent | Offset Length
Standard - 90 deg. | 17.97 | 17.97
Standard - 180 deg. | 21.99 | 17.97 | 10.54
Stirrup/Tie - 90 deg. | 17.00 | 17.00
Stirrup/Tie - 135 deg. | 17.00 | 16.62 | 7.39
Stirrup/Tie Seismic - 135 | 17.00 | 16.62 | 7.39
OK
Cancel
Dimensions
Bar Length 156.91
Total Bar Length 156.91
A 17.00
B 126.17
C 17.00
D 0.00
E 0.00
F 0.00
G 11.50
H 8.00
J 7.39
K 0.00
O 0.00
R 0.00
17.00
11.73
1.27
5.27
126.17
16.62
11.35
10.92
5.27
17.00
11.35 + 10.92 - 5.27
= 17.00

Rebar Shape

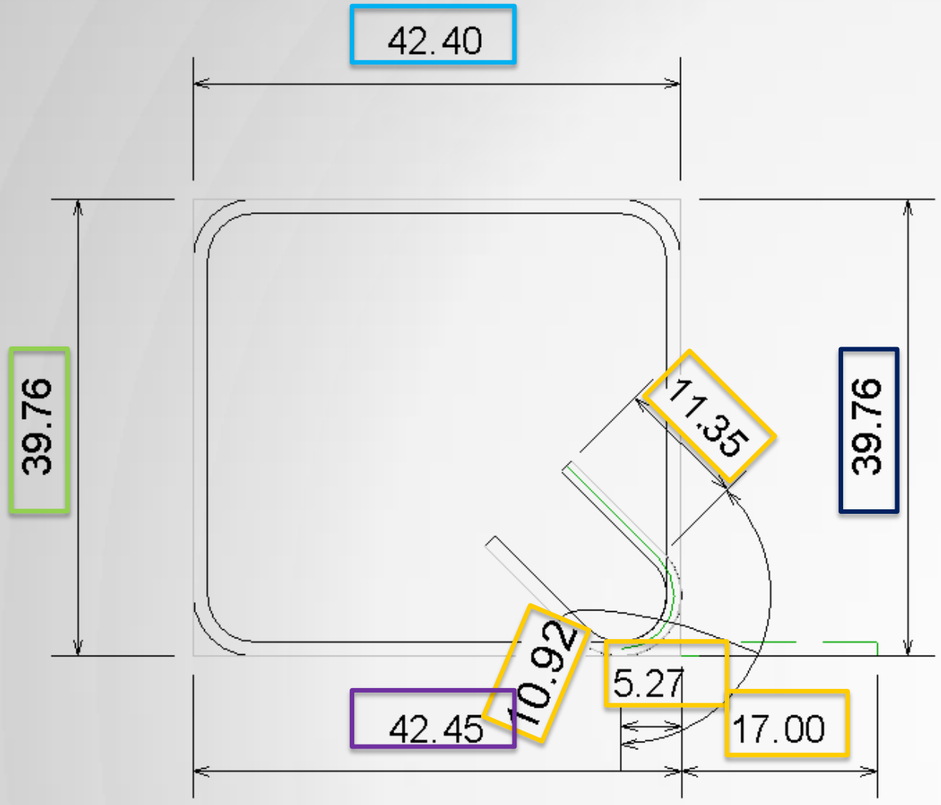


Rebar Shape Parameters

Parameter	Value	Formula
Construction		
Style	Stirrup / Tie	=
Stirrup/Tie Attachment	Interior Face of Cover Referenc	=
Start Tangent Hook Length (defa	115.0 mm	=
Start Hook Offset Length (default	80.0 mm	=
Start Hook Length (default)	115.0 mm	=
Shape Image	<None>	=
Hook At Start	135°	=
Hook At End	135°	=
End Tangent Hook Length (defau	115.0 mm	=
End Hook Offset Length (default)	80.0 mm	=
End Hook Length (default)	115.0 mm	=
Bend Diameter (default)	155.0 mm	=
Bar Diameter (default)	10.0 mm	=
Dimensions		
R (default)	0.0 mm	=
O (default)	0.0 mm	=
K (default)	0.0 mm	=
J (default)	0.0 mm	=
H (default)	80.0 mm	=
G (default)	115.0 mm	=
F (default)	115.0 mm	= End Hook Length
E (default)	1200.0 mm	=
D (default)	1200.0 mm	=
C (default)	1200.0 mm	=
B (default)	1200.0 mm	=
A (default)	115.0 mm	= Start Hook Length

Parameters: Add... | Modify... | Remove

OK | Cancel | Apply | Help



11.35 + 10.92 - 5.27
= 17.00 cm

Dimensions	
Bar Length	188.59
Total Bar Length	188.59
A	17.00
B	42.40
C	39.76
D	42.45
E	39.76
F	17.00
G	0.00
H	8.00
J	0.00
K	0.00
O	0.00
R	0.00

Rebar Hook Lengths

Rebar Bar Type: #04

Rebar Bar Diameter: 1.27

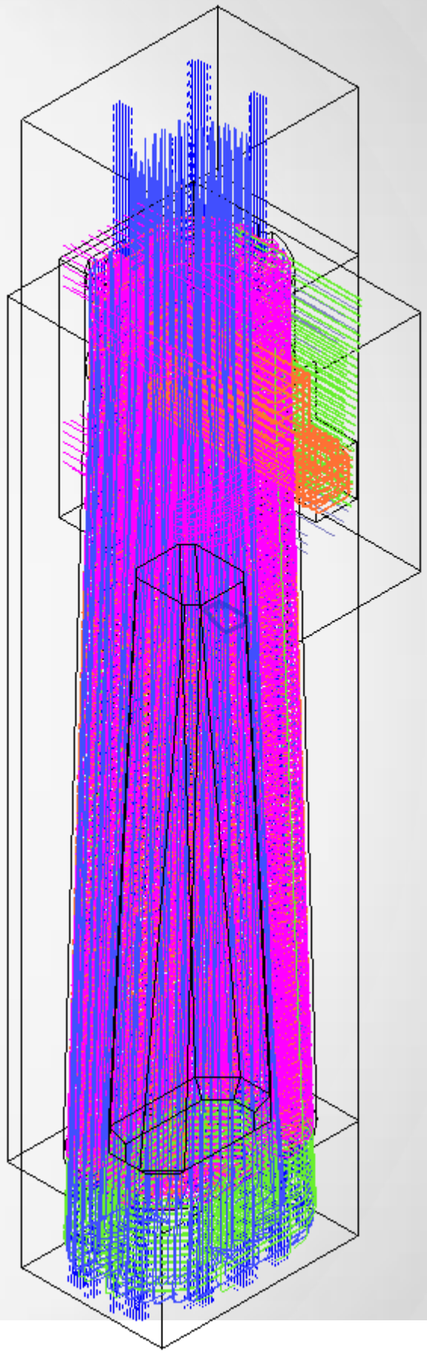
Rebar Hook Length can be automatically calculated based on the Rebar Hook Extension Multiplier property, or the Hook Length can be manually overridden here. The Offset Length is optional and is only used for scheduling

Rebar Hook Type	Auto Calculation	Hook Length	Tangent	Offset Length
Standard - 90 deg.		17.97	17.97	
Standard - 180 deg.		21.99	17.97	10.54
Stirrup/Tie - 90 deg.		17.00	17.00	
Stirrup/Tie - 135 deg.		17.00	16.62	7.39
Stirrup/Tie Seismic - 135		17.00	16.62	7.39

OK Cancel

Generic Model Bounding Box Family

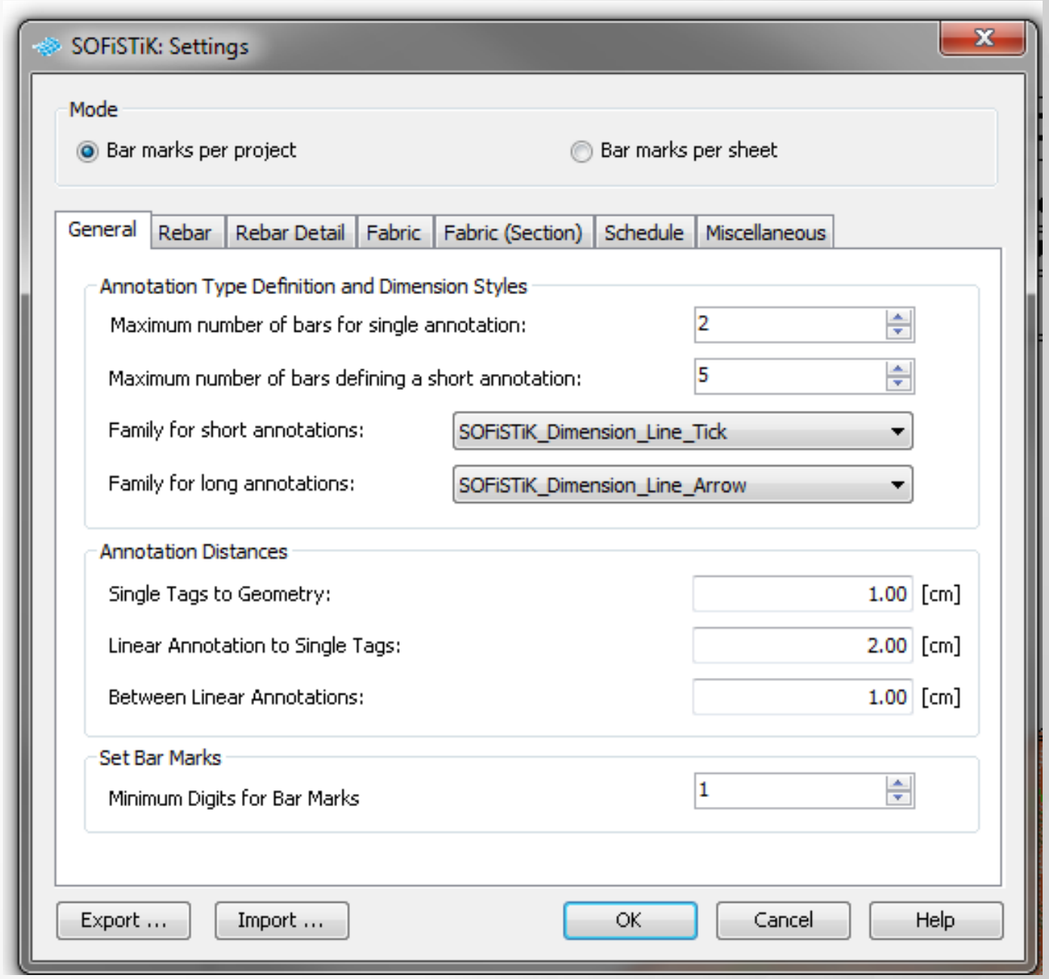
- When the geometry is very complex, the are many rebar hosted in a single element or Revit slows down whenever try to put a rebar. One way to fix it is to put a bounding box around the element and host the rebars to that box



SOFiSTiK
Exporting rebar data to bending machine

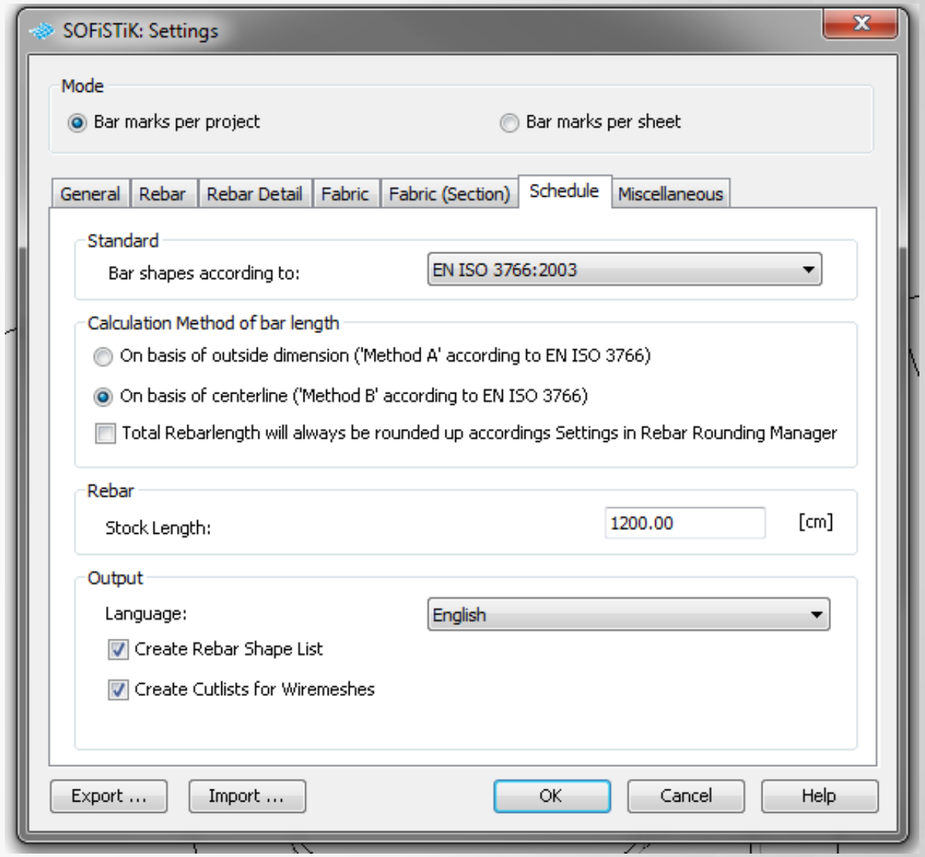
Settings

- In SOFiSTiK there are to ways to get the rebar schedule.
  - **Bar marks per project.** All the rebars of the file are exported
  - **Bar marks per sheet**. Only the rebar in the sheet



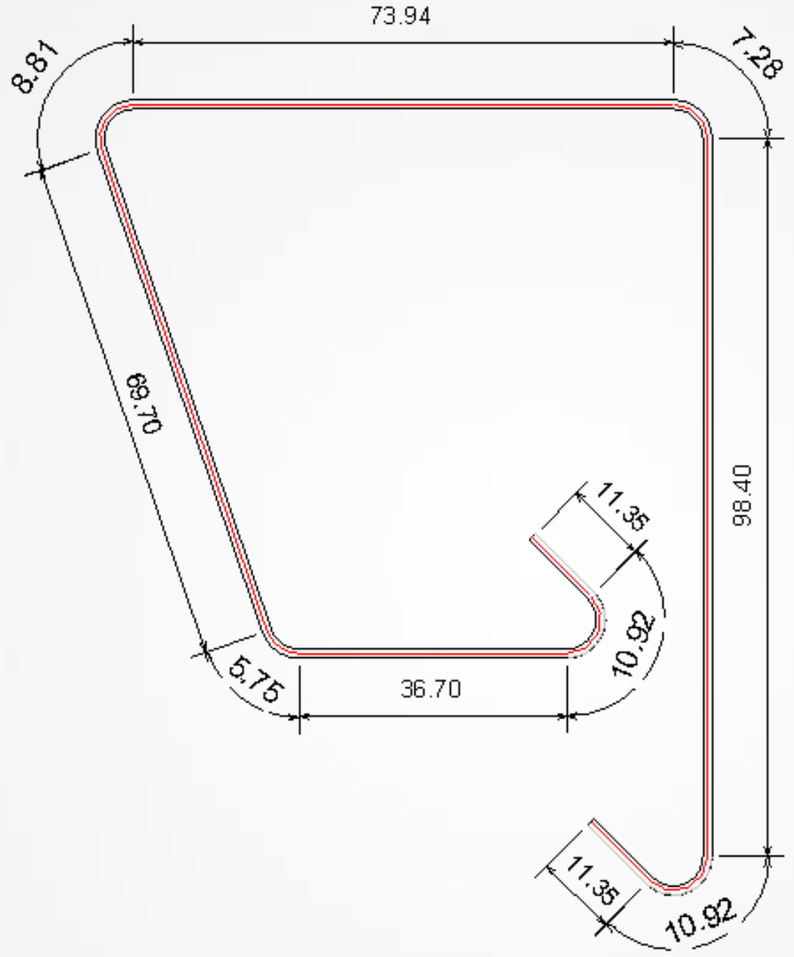
Settings – Rebar Length

- Revit. Use the “real” rebar length using the center line but all the dimension parameter are related to the exterior.
- SOFiSTiK. There are two options:
  - Method A. Use the projection of the exterior faces to calculate the bar length and the hook length
  - Method B. Use the same as Revit using the center lines



Rebar Length Differences

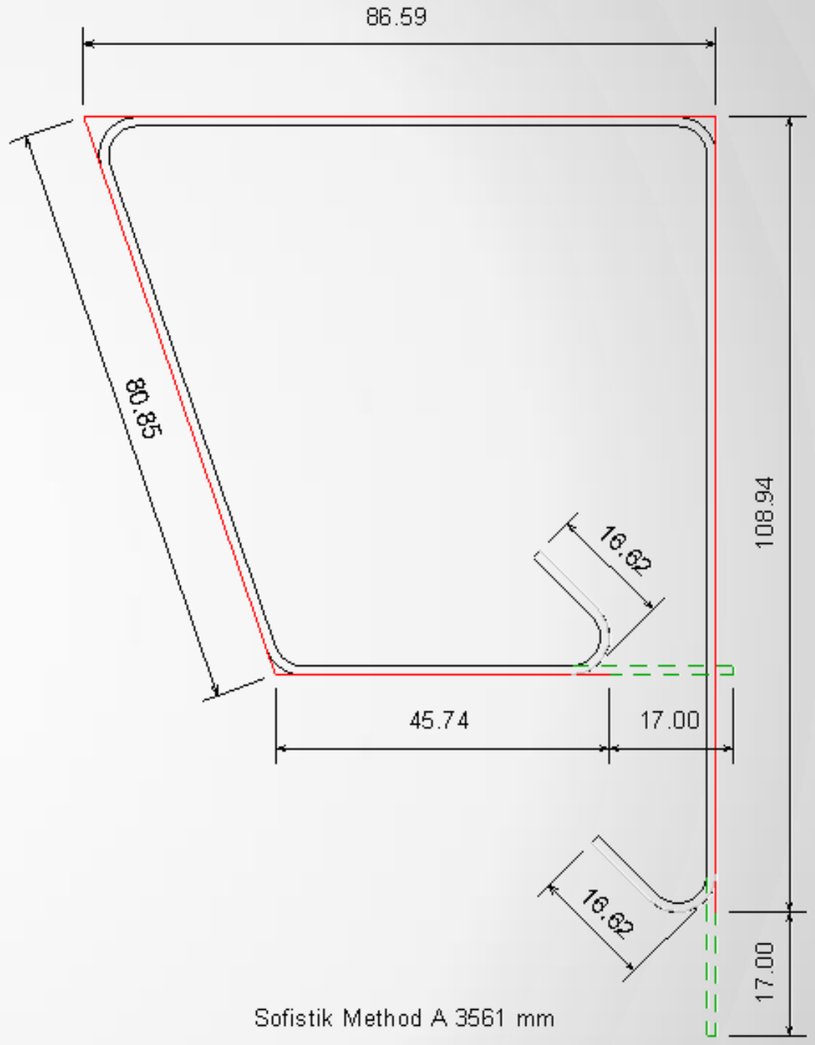
Structural	
Reinforcement Volume	0.0004 m³
Dimensions	
Bar Length	345.13
Total Bar Length	345.13
A	17.00
B	108.94
C	84.48
D	78.74
E	45.74
F	0.00
G	17.00
H	122.00
J	0.00
K	30.00
O	0.00
R	0.00
aA	108.947°
Identity Data	
Image	
Comments	
Mark	aa
Sub-Zona	
Pertenece a	
Ensamble	
SOFiSTiK_Layer	
SOFiSTiK_Bar_Length	356.11
SOFiSTiK_Hosts_Mark	
SOFiSTiK_Rebar_Set	
SOFiSTiK_ShapeCode	
SOFiSTiK_Mark_TotalQua...	
SOFiSTiK_SubMark	
SOFiSTiK_Running_Length	☑
Host Category	Structural Framing
Phasing	



Revit BarLength = 3451 mm

Sofistik Method B = 3451 mm

Center Line



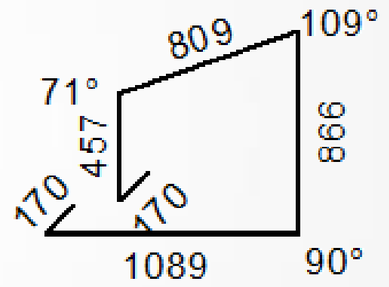
Sofistik Method A 3561 mm

Exterior Rebar Faces

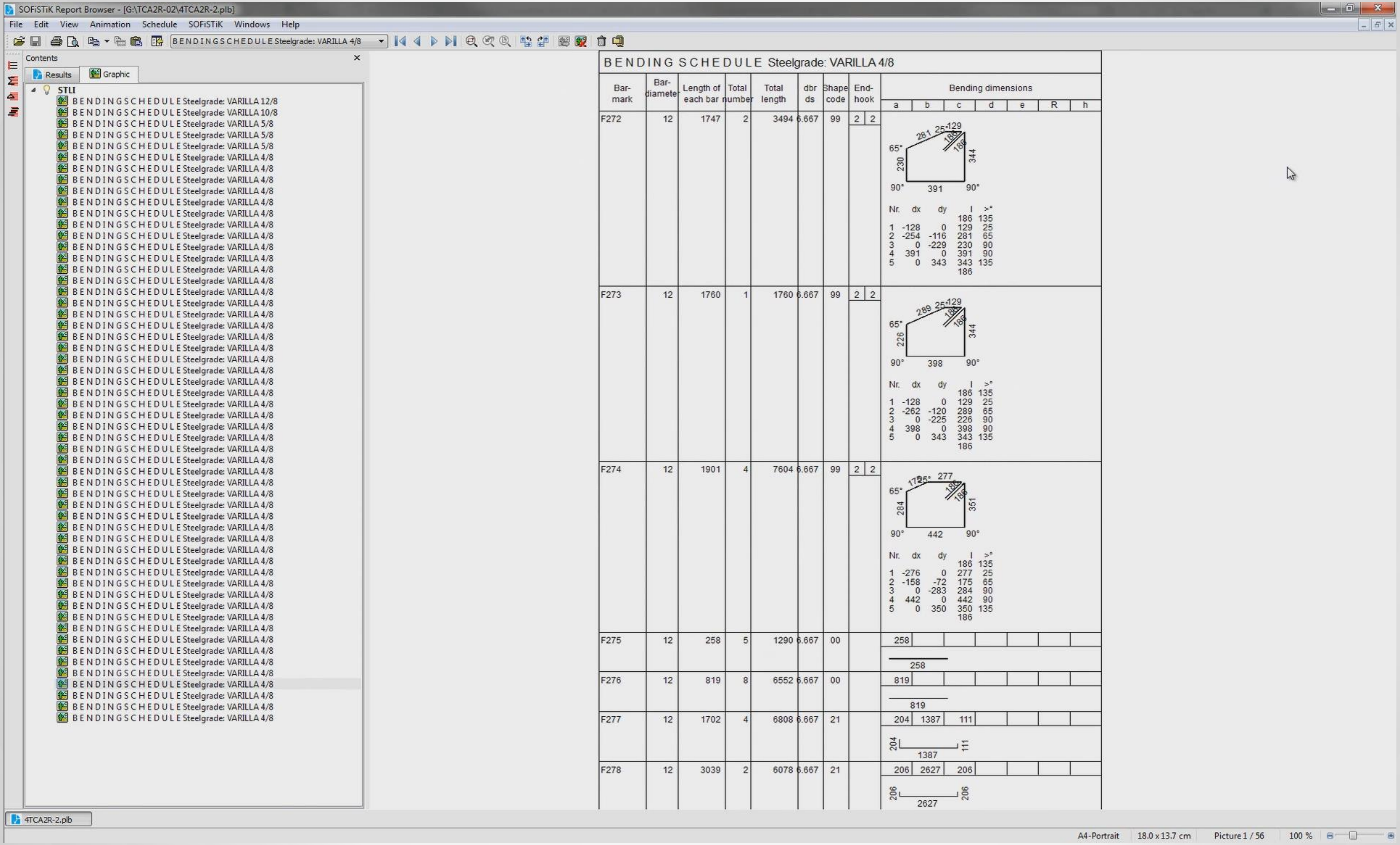
SOFiSTiK Schedule Example

B E N D I N G S C H E D U L E Steelgrade: VARILLA 4/8

Bar-mark	Bar-diameter	Length of each bar	Total number	Total length	dbr ds	Shape code	End-hook		Bending dimensions						
									a	b	c	d	e	R	h
AA	12.7	3561	2	7122	6.299	99	2	2							



Nr.	dx	dy	l	>°
			170	135
1	1089	0	1089	90
2	0	866	866	109
3	-764	-261	809	71
4	0	-456	457	135
			170	



B E N D I N G S C H E D U L E Steelgrade: VARILLA 4/8

Bar-mark	Bar-diameter	Length of each bar	Total number	Total length	dbr ds	Shape code	End-hook		Bending dimensions a	b	c	d	e	R	h
F272	12	1747	2	3494	6.667	99	2	2							
F273	12	1760	1	1760	6.667	99	2	2							
F274	12	1901	4	7604	6.667	99	2	2							
F275	12	258	5	1290	6.667	00			258						
F276	12	819	8	6552	6.667	00			819						
F277	12	1702	4	6808	6.667	21			204	1387	111				
F278	12	3039	2	6078	6.667	21			206	2627	206				

F272

Nr.	dx	dy	l	>°
			186	135
1	-128	0	129	25
2	-254	-116	281	65
3	0	-229	230	90
4	391	0	391	90
5	0	343	343	135
			186	

F273

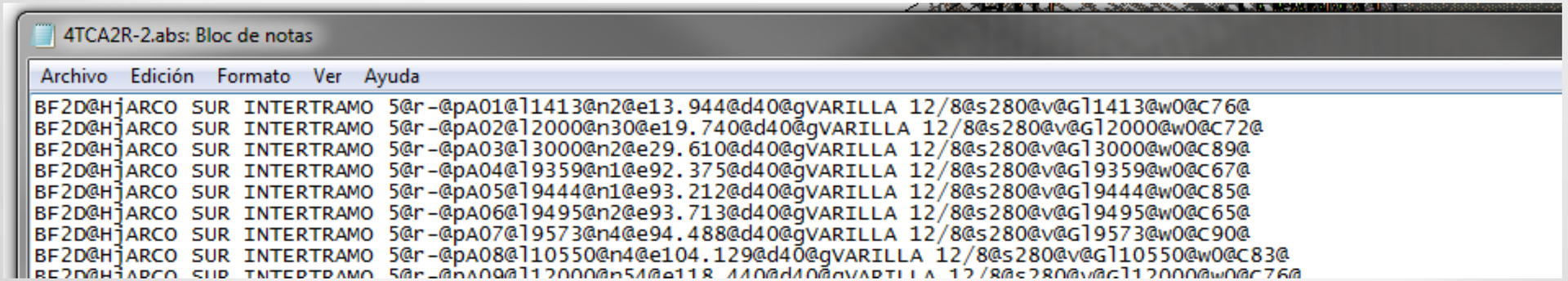
Nr.	dx	dy	l	>°
			186	135
1	-128	0	129	25
2	-262	-120	289	65
3	0	-225	226	90
4	398	0	398	90
5	0	343	343	135
			186	

F274

Nr.	dx	dy	l	>°
			186	135
1	-276	0	277	25
2	-158	-72	175	65
3	0	-283	284	90
4	442	0	442	90
5	0	350	350	135
			186	

SOFiSTiK BVBS File

- When creates the Schedule, in the same directory creates a file with the name of the Revit file and the extension *.abs if the file is opened on notepad shows all the rebar information in the standard BVBS format.
- This file feeds the software of the rebar bender machines



Lessons Learned

- Its very important to know the bender mandrels diameter before sending to production and change the hook bend diameter on Revit

- SOFiSTiK uses the Mark for its schedule, all the rebars that their mark are empty the program omits them in the schedule.

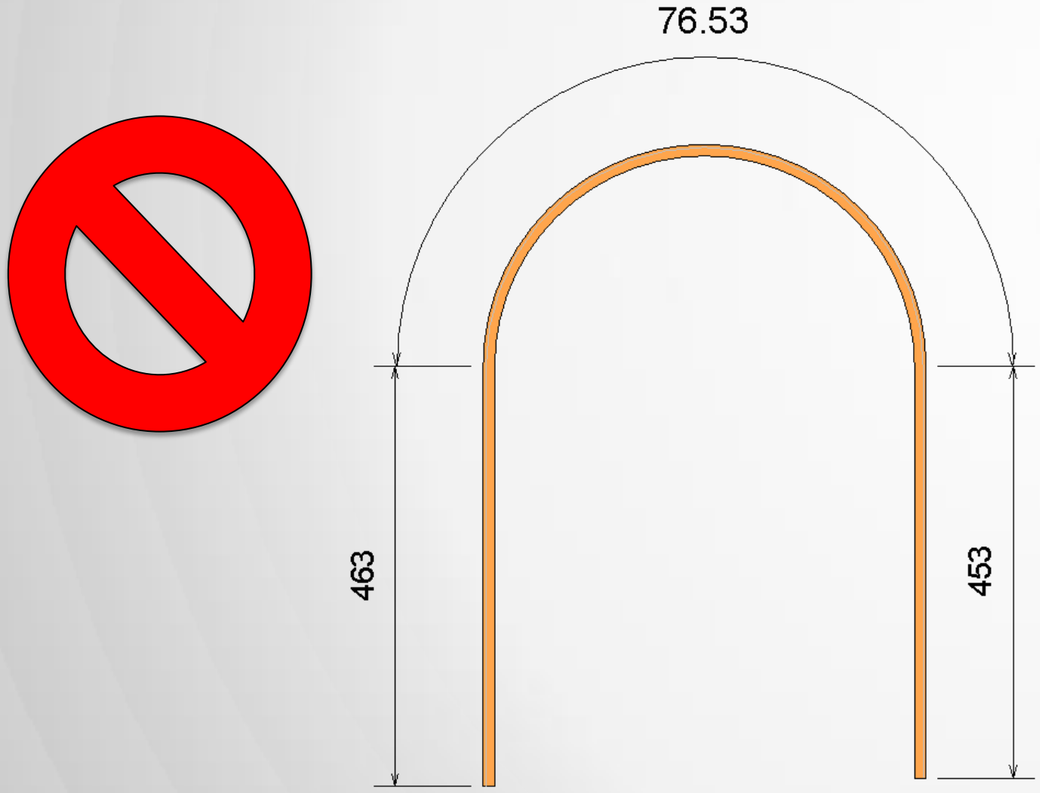
Lessons Learned

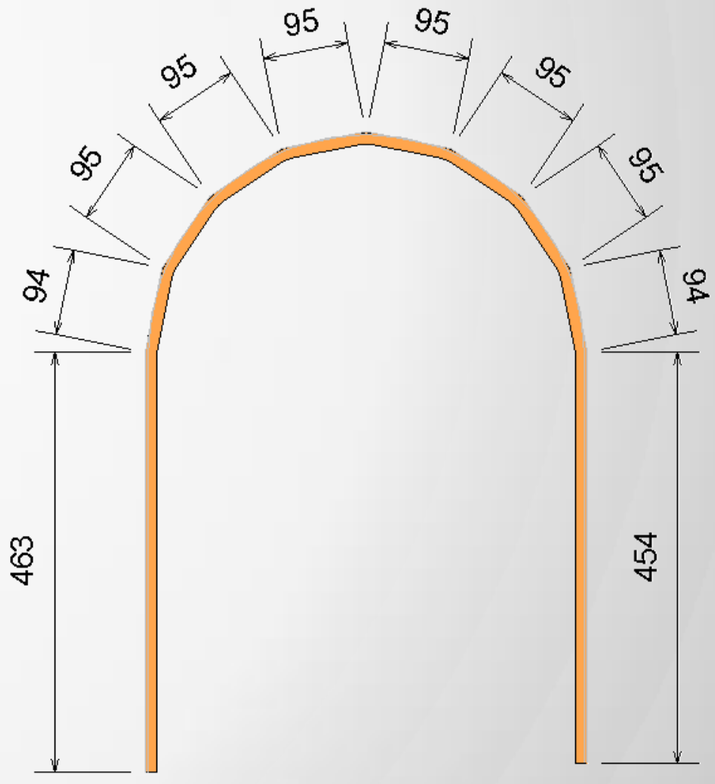
- The mark needs to be unique, if the pieces are different SOFiSTiK finds inconsistent information and omits the duplicated rebar from the schedule

- Its necessary to check the rebar max stock length on the plant for each rebar diameter and to cut them in the model.

Lessons Learned

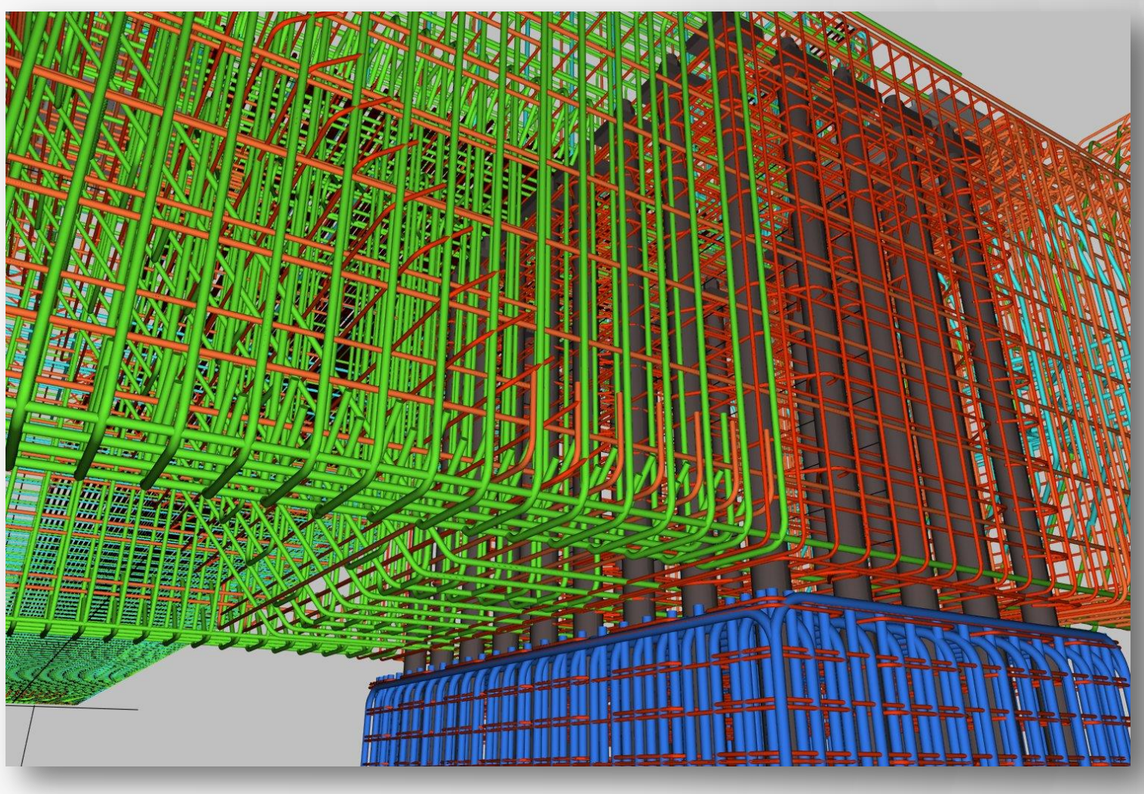
- The rebar segments must be linear, if the shape contains arcs needs to be segmented.

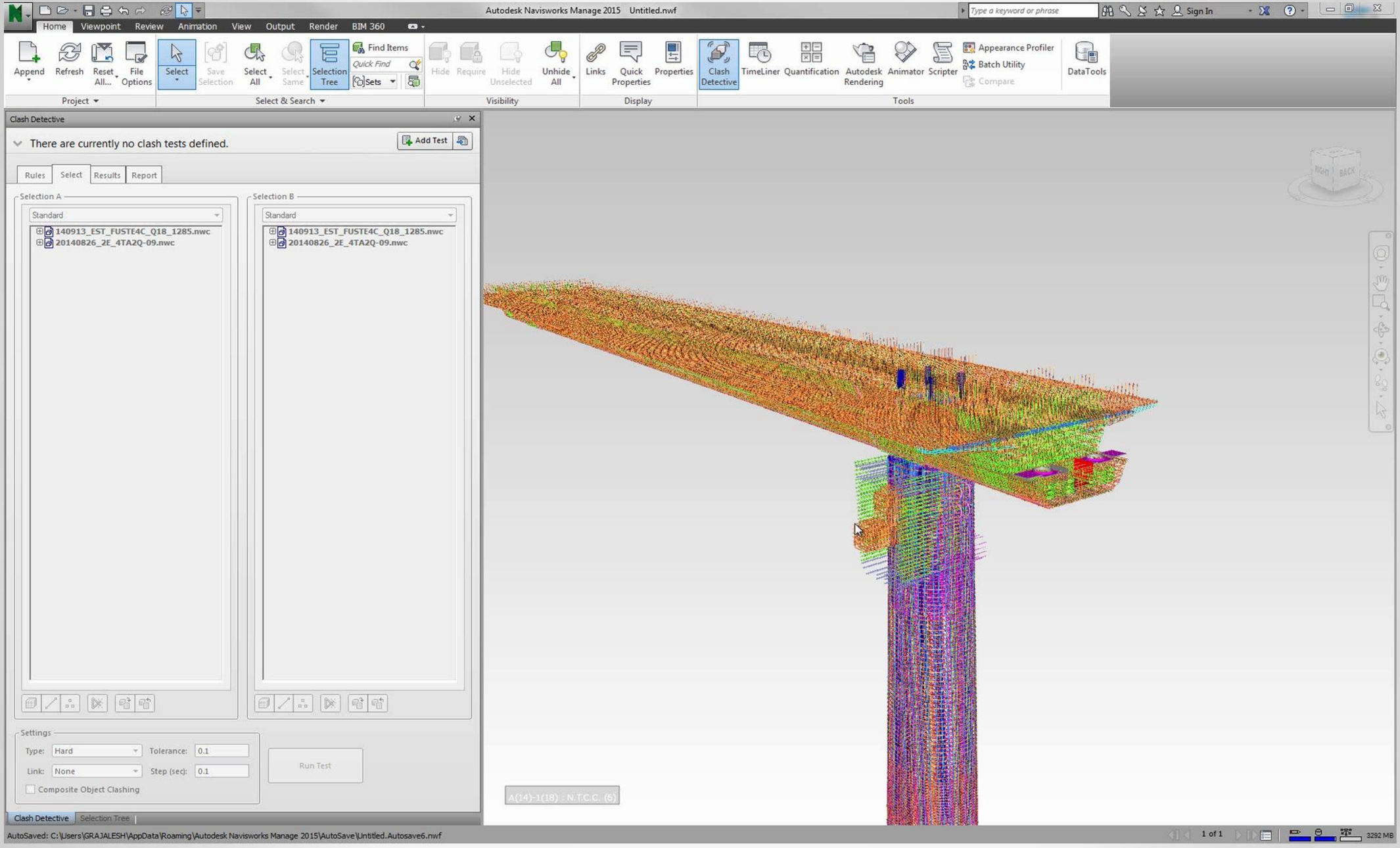


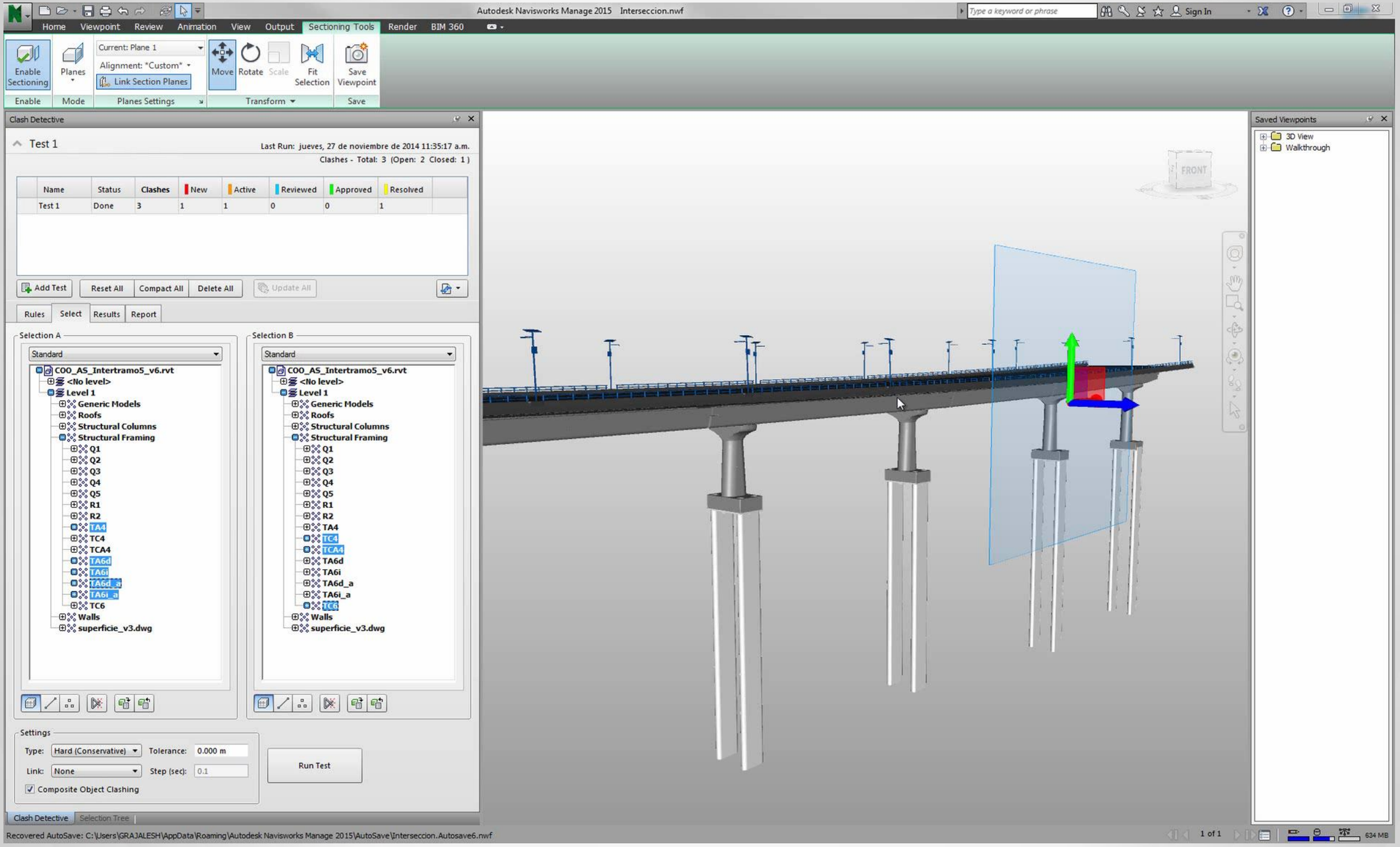


Clash Detection in Navisworks

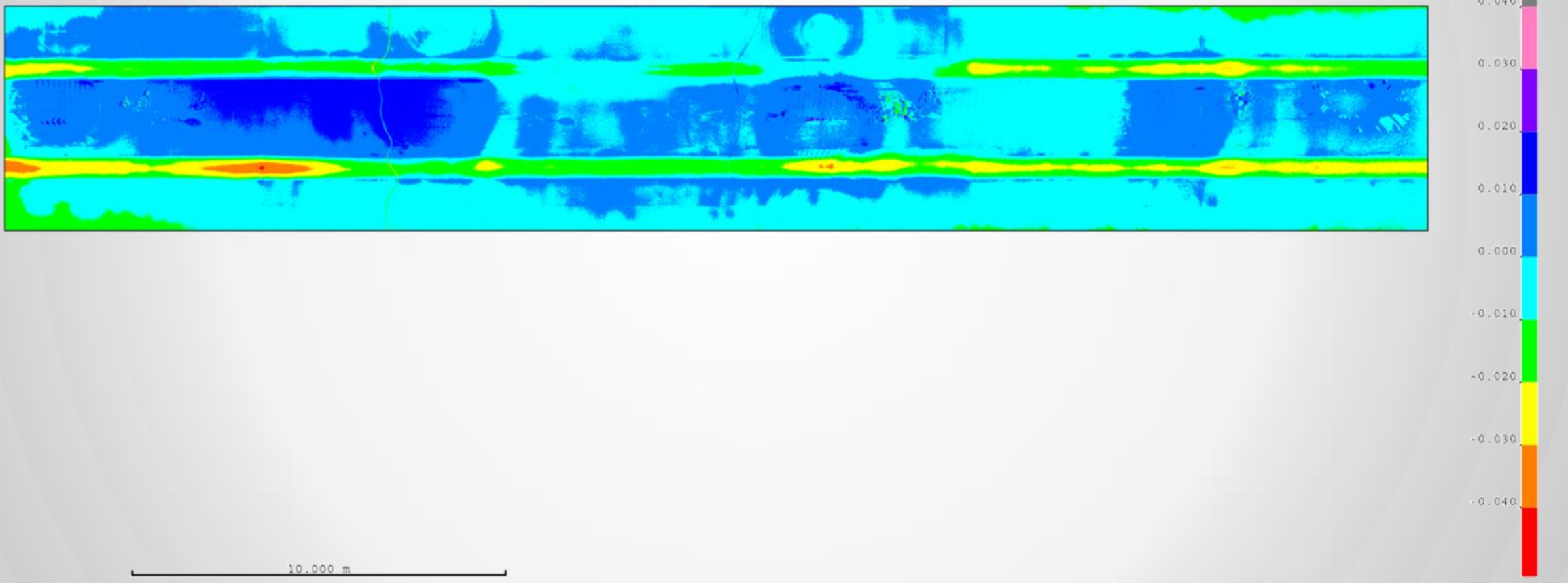
- From the Fabricator point of view the most important clashes to find are:
  - The connections with other elements
  - Ducts of strands
  - The space between TA girders is enough to fit the central
- Almost all clashes detected are corrected on the fabric and not on site

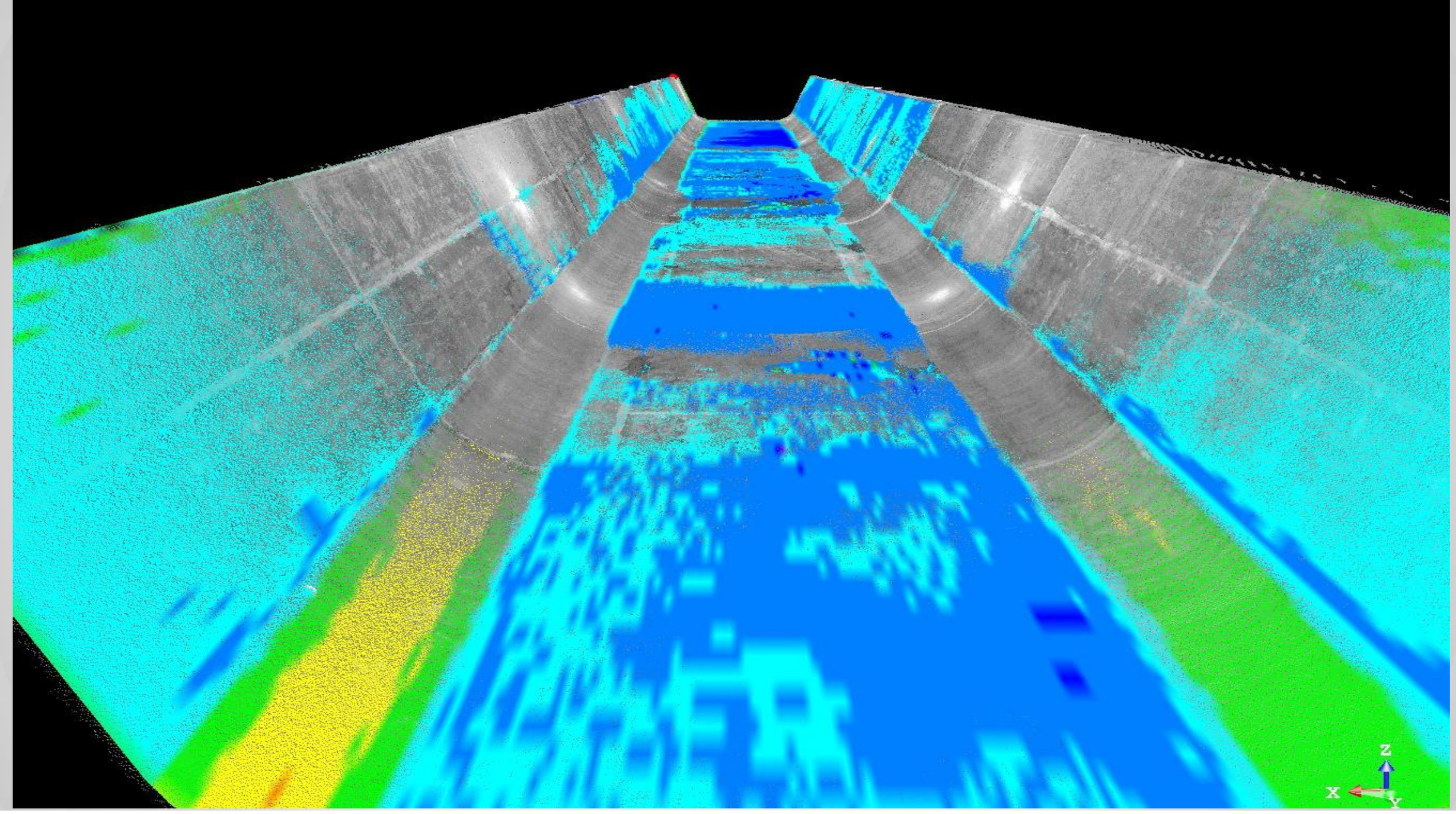


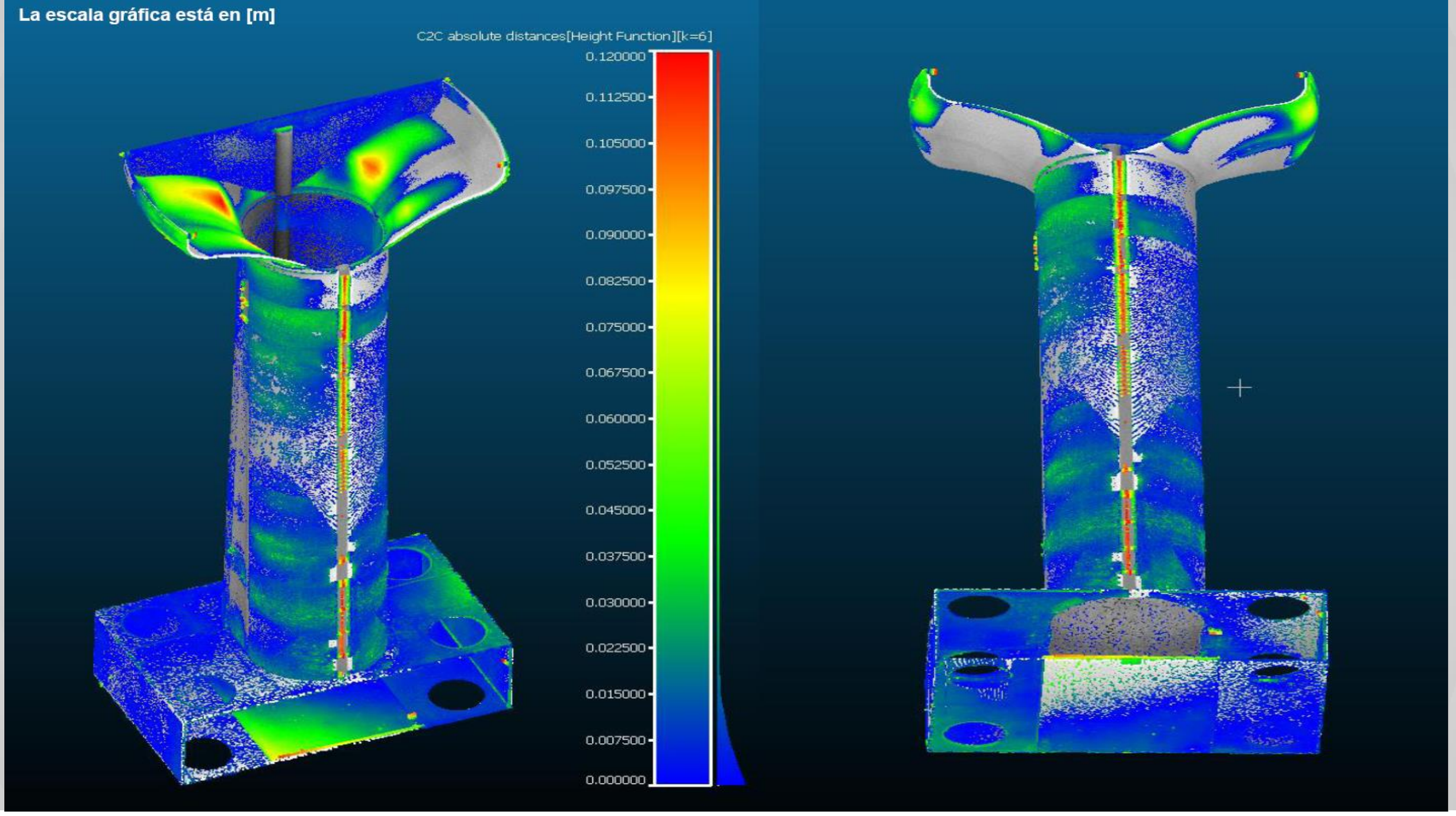

Autodesk Navisworks Manage 2015 Untitled.nwf
Type a keyword or phrase
Sign In
Home
Viewpoint
Review
Animation
View
Output
Render
BIM 360
Append
Refresh
Reset All...
File Options
Project
Select
Save Selection
Select All
Select Same
Selection Tree
Find Items
Quick Find
Sets
Select & Search
Hide
Require
Hide Unselected
Unhide All
Visibility
Links
Quick Properties
Properties
Display
Clash Detective
TimeLiner
Quantification
Autodesk Rendering
Animator
Scripter
Appearance Profiler
Batch Utility
Compare
DataTools
Tools
Clash Detective
There are currently no clash tests defined.
Add Test
Rules
Select
Results
Report
Selection A
Standard
140913_EST_FUSTE4C_Q18_1285.nwc
20140826_2E_4TA2Q-09.nwc
Selection B
Standard
140913_EST_FUSTE4C_Q18_1285.nwc
20140826_2E_4TA2Q-09.nwc
Settings
Type: Hard
Tolerance: 0.1
Link: None
Step (sec): 0.1
Composite Object Clashing
Run Test
Clash Detective
Selection Tree
A(14)-1(18) : N.T.C.C. (6)
AutoSaved: C:\Users\GRAJALESH\AppData\Roaming\Autodesk Navisworks Manage 2015\AutoSave\Untitled.Autosave6.nwf
1 of 1
3292 MB


Autodesk Navisworks Manage 2015 Interseccion.nwf
Home Viewpoint Review Animation View Output Sectioning Tools Render BIM 360
Enable Sectioning
Planes
Current: Plane 1
Alignment: *Custom*
Link Section Planes
Move Rotate Scale Fit Selection Save Viewpoint
Enable Mode Planes Settings Transform Save
Clash Detective
Test 1
Last Run: jueves, 27 de noviembre de 2014 11:35:17 a.m.
Clashes - Total: 3 (Open: 2 Closed: 1)
Name Status Clashes New Active Reviewed Approved Resolved
Test 1 Done 3 1 1 0 0 1
Add Test Reset All Compact All Delete All Update All
Rules Select Results Report
Selection A
Standard
C00_AS_Intertramo5_v6.rvt
<No level>
Level 1
Generic Models
Roofs
Structural Columns
Structural Framing
Q1 Q2 Q3 Q4 Q5 R1 R2 TA4 TC4 TCA4 TA6d TA6i TA6d_a TA6i_a TC6
Walls
superficie_v3.dwg
Selection B
Standard
C00_AS_Intertramo5_v6.rvt
<No level>
Level 1
Generic Models
Roofs
Structural Columns
Structural Framing
Q1 Q2 Q3 Q4 Q5 R1 R2 TA4 TC4 TCA4 TA6d TA6i TA6d_a TA6i_a TC6
Walls
superficie_v3.dwg
Settings
Type: Hard (Conservative) Tolerance: 0.000 m
Link: None Step (sec): 0.1
Composite Object Clashing
Run Test
Clash Detective Selection Tree
Saved Viewpoints
3D View
Walkthrough
FRONT
Recovered AutoSave: C:\Users\GRAJALESH\AppData\Roaming\Autodesk Navisworks Manage 2015\AutoSave\Interseccion.Autosave6.nwf
1 of 1
634 MB

Point Clouds comparison using CloudCompare


(m)
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
-0.010
-0.020
-0.030
-0.040
10.000 m


Z
X
Y


La escala gráfica está en [m]
C2C absolute distances[Height Function][k=6]
0.120000
0.112500
0.105000
0.097500
0.090000
0.082500
0.075000
0.067500
0.060000
0.052500
0.045000
0.037500
0.030000
0.022500
0.015000
0.007500
0.000000

Fabrication Process


10 ton


10.02.2011 09:25


ICA
HABILITADO DE ACERO DE REFUERZO APROBADO
PLANO
Ica
CLIENTE
[redacted]
ELEMENTO
FC02-C
PIEZAS
5
DIMENSIONES
4180
KILOS
62
OBRA
FECHA
ORDEN DE COMPRA
OBSERVACIONES
Prueba
REMISION / No. DE ENVIO


10.02.2011 09:27


TRAVELIFT
PRET
FECSA


MI-JAC
MI-JAC


MJ176
TRAVELIFT
ICA
PRET


PRET


PRET


ICA
PRET
ICA
Santander


ITA4-3
CA
Cargo


ITA4-3
Cargo
ICA
Santander
Goldhofer


ITA4-3
Santander
CA
cargo


ITA4-3
cargo
ICA
Santander


SALAS
desde $4,990
80


VIADUCTO TLALPAN
ESTADIO AZTECA


BANCO INBURSA


POLICÍA FEDERAL


BANCO INBURSA


POLICÍA FEDERAL


OK
PAUSE
FEED
CANCEL
ZEBRA ZT230
PRET
ICA
PLANTA
COLUMNA R23
CODIGO
G01
GRUPO
BAMBINETO
PZAS.
40
DIAM.
10
BAMBINETO
FECHA
08-08-14
ARCO SUR
5

Q&A

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Session Feedback

- Via the Survey Stations, email or mobile device
- AU 2014 passes given out each day!
- Best to do it right after the session
- Instructors see results in real-time