

## Anejo D

# Código VBA de generación de archivos python

A continuación se muestra el código en Visual Basic del programa que genera los archivos en formato python para su postprocesamiento por la herramienta DIANA. Dicho programa trabaja a partir de los datos facilitados por el usuario en cada hoja del libro, una por cada viga a analizar.

```
1 Sub generador_DIANA()  
2  
3 'CREACIÓN DEL ARCHIVO DE TEXTO  
4  
5 Dim nombreanálisis As String  
6 Dim celda As String  
7 Dim escalonescarga As String  
8 Set fs = CreateObject("Scripting.FileSystemObject")  
9 Dim ruta As String  
10 ruta = (Worksheets(1).Range("D9"))  
11 Set A = fs.CreateTextFile(ruta, True)  
12 Dim numeroviga As Long  
13 numeroviga = Worksheets.Count  
14 Dim i As Long  
15 Dim ii As Long  
16 ii = numeroviga  
17  
18 For ii = 1 To numeroviga 2  
19  
20 celda = "D" & (15 + ii)  
21 If Worksheets(1).Range(celda) = "SI" Then  
22  
23 'INTRODUCCIÓN DE DATOS PREVIOS DEL PROGRAMA  
24  
25 A.WriteLine "newProject("." / Untitled / Untitled", 100)  
26 A.WriteLine "setModelAnalysisAspects([\"STRUCT\"])"  
27 A.WriteLine "setModelDimension(\"2D\")"  
28 A.WriteLine "setDefaultMeshOrder(\"QUADRATIC\")"  
29 A.WriteLine "setDefaultMesherType(\"HEXQUAD\")"  
30 nombreanálisis = Worksheets(ii + 1).Name  
31 A.WriteLine "saveProjectAs(\" & Chr(34) & Worksheets(1).Range("D10")  
    & nombreanálisis & ".dpf" & Chr(34) & ")"
```

## 'CREACIÓN DE LAS DISTINTAS ÁREAS

```

Dim X1 As Double
Dim X2 As Double
Dim X3 As Double
Dim X4 As Double
Dim Y1 As Double
Dim Y2 As Double
Dim Y3 As Double
Dim Y4 As Double

```

## 'VIGA DE HORMIGÓN

```

X1 = Worksheets(ii + 1).Range("B12")
Y1 = Worksheets(ii + 1).Range("B13")
X2 = Worksheets(ii + 1).Range("C12")
Y2 = Worksheets(ii + 1).Range("C13")
X3 = Worksheets(ii + 1).Range("D12")
Y3 = Worksheets(ii + 1).Range("D13")
X4 = Worksheets(ii + 1).Range("E12")
Y4 = Worksheets(ii + 1).Range("E13")

A.WriteLine "createSheet(_" & "VIGA", _[[" & X1 & "," & Y1 & "," & 0 & "
    ],[" & X2 & "," & Y2 & "," & 0 & "],[" & X3 & "," & Y3 & "," & 0 & "
    "],[" & X4 & "," & Y4 & "," & 0 & "]]_)"

```

## 'PLACA DE CARGA

```

X1 = (Worksheets(ii + 1).Range("C17") / 2) (Worksheets(ii + 1).
    Range("D22") / 2)
Y1 = Worksheets(ii + 1).Range("C19")
X2 = (Worksheets(ii + 1).Range("C17") / 2) + (Worksheets(ii + 1).
    Range("D22") / 2)
Y2 = Worksheets(ii + 1).Range("C19")
X3 = (Worksheets(ii + 1).Range("C17") / 2) + (Worksheets(ii + 1).
    Range("D22") / 2)
Y3 = Worksheets(ii + 1).Range("C19") + Worksheets(ii + 1).Range("E22"
    )
X4 = (Worksheets(ii + 1).Range("C17") / 2)
Y4 = Worksheets(ii + 1).Range("C19") + Worksheets(ii + 1).Range("E22"
    )
X5 = (Worksheets(ii + 1).Range("C17") / 2) (Worksheets(ii + 1).
    Range("D22") / 2)
Y5 = Worksheets(ii + 1).Range("C19") + Worksheets(ii + 1).Range("E22"
    )

A.WriteLine "createSheet(_" & "PLACA CARGA", _[[" & X1 & "," & Y1 & ","
    & 0 & "],[" & X2 & "," & Y2 & "," & 0 & "],[" & X3 & "," & Y3 & ","
    " & 0 & "],[" & X4 & "," & Y4 & "," & 0 & "],[" & X5 & "," & Y5 &
    "," & 0 & "]]_)"

```

```

71 'APOYO 1
72
73 X1 = 0.7 (Worksheets(ii + 1).Range("D25") / 2)
74 Y1 = (Worksheets(ii + 1).Range("E25"))
75 X2 = 0.7
76 Y2 = (Worksheets(ii + 1).Range("E25"))
77 X3 = 0.7 + (Worksheets(ii + 1).Range("D25") / 2)
78 Y3 = (Worksheets(ii + 1).Range("E25"))
79 X4 = 0.7 + (Worksheets(ii + 1).Range("D25") / 2)
80 Y4 = 0
81 X5 = 0.7 (Worksheets(ii + 1).Range("D25") / 2)
82 Y5 = 0
83
84 A.WriteLine "createSheet(_"APOYO 1",_[" & X1 & "," & Y1 & "," & 0
    & "],[ & X2 & "," & Y2 & "," & 0 & "],[ & X3 & "," & Y3 & "," &
    0 & "],[ & X4 & "," & Y4 & "," & 0 & "],[ & X5 & "," & Y5 & ","
    & 0 & "]]_)"
85
86 'APOYO 2
87
88 X1 = 0.7 (Worksheets(ii + 1).Range("D25") / 2) + (Worksheets(ii +
    1).Range("C17") 1.4)
89 Y1 = (Worksheets(ii + 1).Range("E25"))
90 X2 = 0.7 + (Worksheets(ii + 1).Range("C17") 1.4)
91 Y2 = (Worksheets(ii + 1).Range("E25"))
92 X3 = 0.7 + (Worksheets(ii + 1).Range("D25") / 2) + (Worksheets(ii +
    1).Range("C17") 1.4)
93 Y3 = (Worksheets(ii + 1).Range("E25"))
94 X4 = 0.7 + (Worksheets(ii + 1).Range("D25") / 2) + (Worksheets(ii +
    1).Range("C17") 1.4)
95 Y4 = 0
96 X5 = 0.7 (Worksheets(ii + 1).Range("D25") / 2) + (Worksheets(ii +
    1).Range("C17") 1.4)
97 Y5 = 0
98
99 A.WriteLine "createSheet(_"APOYO 2",_[" & X1 & "," & Y1 & "," & 0
    & "],[ & X2 & "," & Y2 & "," & 0 & "],[ & X3 & "," & Y3 & "," &
    0 & "],[ & X4 & "," & Y4 & "," & 0 & "],[ & X5 & "," & Y5 & ","
    & 0 & "]]_)"
100
101
102 'ASIGNACIÓN DE FUERZAS
103
104
105 A.WriteLine "addSet(_"GEOMETRYLOADSET",_"CASO_DE_CARGA_1"_) "
106 A.WriteLine "createPointLoad(_"Fuerza",_"CASO_DE_CARGA_1"_) "
107 A.WriteLine "setParameter(_"GEOMETRYLOAD",_"Fuerza",_"FORCE/
    VALUE",_ & Worksheets(ii + 1).Range("B30") & ") "
108 A.WriteLine "setParameter(_"GEOMETRYLOAD",_"Fuerza",_"FORCE/
    DIRECT",_2_) "
109 A.WriteLine "attach(_"GEOMETRYLOAD",_"Fuerza",_"PLACA CARGA",_

```

```

110  [| " & (Worksheets(ii + 1).Range("C17") / 2) & "," & Worksheets(ii
    + 1).Range("C19") + Worksheets(ii + 1).Range("E22") & ",_0_]_] "
111  'ASIGNACIÓN DE CONDICIONES DE CONTORNO
112  '
113  A.WriteLine "addSet(_"GEOMETRYSUPPORTSET" ,_"APOYOS"_) "
114  A.WriteLine "createPointSupport(_"AP1" ,_"APOYOS"_) "
115  A.WriteLine "setParameter(_"GEOMETRYSUPPORT" ,_"AP1" ,_"AXES" ,_[_
    1,_2_]_) "
116  A.WriteLine "setParameter(_"GEOMETRYSUPPORT" ,_"AP1" ,_"TRANSL" ,_
    [_1,_1,_0_]_) "
117  A.WriteLine "setParameter(_"GEOMETRYSUPPORT" ,_"AP1" ,_"ROTATI" ,_
    [_0,_0,_0_]_) "
118  A.WriteLine "attach(_"GEOMETRYSUPPORT" ,_"AP1" ,_"APOYO 1 " ,_[_
    0.7," & (Worksheets(ii + 1).Range("E25")) & ",_0_]_] "
119  A.WriteLine "createPointSupport(_"AP2" ,_"APOYOS"_) "
120  A.WriteLine "setParameter(_"GEOMETRYSUPPORT" ,_"AP2" ,_"AXES" ,_[_
    1,_2_]_) "
121  A.WriteLine "setParameter(_"GEOMETRYSUPPORT" ,_"AP2" ,_"TRANSL" ,_
    [_0,_1,_0_]_) "
122  A.WriteLine "setParameter(_"GEOMETRYSUPPORT" ,_"AP2" ,_"ROTATI" ,_
    [_0,_0,_0_]_) "
123  A.WriteLine "attach(_"GEOMETRYSUPPORT" ,_"AP2" ,_"APOYO 2 " ,[| " &
    0.7 + (Worksheets(ii + 1).Range("C17") 1.4) & "," & (
    Worksheets(ii + 1).Range("E25")) & ",_0_]_] "
124  '
125  'CREACIÓN DE LA BARRA DE ARMADURA
126  '
127  A.WriteLine "createLine(_"Armadura_superior" ,_[| " & Worksheets(ii +
    1).Range("B37") & "," & Worksheets(ii + 1).Range("B38") & "," & 0
    & "],_[| " & Worksheets(ii + 1).Range("C37") & "," & Worksheets(ii +
    1).Range("C38") & "," & 0 & "]) "
128  A.WriteLine "createLine(_"Cord inf S" ,_[| " & Worksheets(ii + 1).
    Range("E37") & "," & Worksheets(ii + 1).Range("E38") & "," & 0 & "
    ],_[| " & Worksheets(ii + 1).Range("F37") & "," & Worksheets(ii + 1)
    .Range("F38") & "," & 0 & "]) "
129  A.WriteLine "createLine(_"Cord inf I" ,_[| " & Worksheets(ii + 1).
    Range("H37") & "," & Worksheets(ii + 1).Range("H38") & "," & 0 & "
    ],_[| " & Worksheets(ii + 1).Range("I37") & "," & Worksheets(ii + 1)
    .Range("I38") & "," & 0 & "]) "
130
131
132

```

```

133 'MATERIALES DE LA ARMADURA Y ASIGNACIÓN (SE HA DEFINIDO COMO LINEAL)
134 '
135 'ARMADURA SUPERIOR
136
137 A.WriteLine "addMaterial(_"Armاد_sup","MCSTEL","TRESCA",_[])
138 A.WriteLine "setParameter(_"MATERIAL","Armاد_sup","LINEAR/
    ELASTI/YOUNG",_2e+11_)
139 A.WriteLine "setParameter(_"MATERIAL","Armاد_sup","LINEAR/
    ELASTI/POISON",_0.3_)
140 A.WriteLine "setParameter(_"MATERIAL","Armاد_sup","TREPLA/
    YLDSTR",_ & Worksheets(ii + 1).Range("F46") & ")
141
142 A.WriteLine "addGeometry(_"Area_Armاد_sup","RELIN","REBAR",_
    [])
143 A.WriteLine "setParameter(_"GEOMET","Area_Armاد_sup","REIEMB/
    CROSSE",_ & Worksheets(ii + 1).Range("C44") & ")
144 A.WriteLine "setReinforcementAspects_([_ "Armادura_superior" _])
145 A.WriteLine "assignMaterial(_"Armاد_sup","SHAPE",_[_ "Armادura_
    superior" _])
146 A.WriteLine "assignGeometry(_"Area_Armاد_sup","SHAPE",_[_ "
    Armادura_superior" _])
147 A.WriteLine "resetElementData(_"SHAPE",_[_ "Armادura_superior" _])
148 A.WriteLine "setReinforcementDiscretization(_[_ "Armادura_superior" _
    ],_"ELEMENT"_)
149
150 'ARMADURA INF S
151 A.WriteLine "addMaterial(_"Armاد_inf_S","MCSTEL","TRESCA",_[])
152 A.WriteLine "setParameter(_"MATERIAL","Armاد_inf_S","LINEAR/
    ELASTI/YOUNG",_2e+11_)
153 A.WriteLine "setParameter(_"MATERIAL","Armاد_inf_S","LINEAR/
    ELASTI/POISON",_0.3_)
154 A.WriteLine "setParameter(_"MATERIAL","Armاد_inf_S","TREPLA/
    YLDSTR",_ & Worksheets(ii + 1).Range("F46") & ")
155 A.WriteLine "addGeometry(_"Area_Armاد_inf_S","RELIN","REBAR"
    ,_[])
156 A.WriteLine "setParameter(_"GEOMET","Area_Armاد_inf_S","REIEMB
    /CROSSE",_ & Worksheets(ii + 1).Range("F44") & ")
157 A.WriteLine "setReinforcementAspects_([_ "Cord inf S" _])
158 A.WriteLine "assignMaterial(_"Armاد_inf_S","SHAPE",_[_ "Cord inf
    S" _])
159 A.WriteLine "assignGeometry(_"Area_Armاد_inf_S","SHAPE",_[_ "
    Cord inf S" _])
160 A.WriteLine "resetElementData(_"SHAPE",_[_ "Cord inf S" _])
161 A.WriteLine "setReinforcementDiscretization(_[_ "Cord inf S" _],_"
    ELEMENT"_)
162

```

```

163 'ARMADURA INF I
164 A.WriteLine "addMaterial(_"Armada_inf_I",_"MCSTEL",_"TRESCA",_[]
    _)"
165 A.WriteLine "setParameter(_"MATERIAL",_"Armada_inf_I",_"LINEAR/
    ELASTI/YOUNG",_2e+11_)"
166 A.WriteLine "setParameter(_"MATERIAL",_"Armada_inf_I",_"LINEAR/
    ELASTI/POISON",_0.3_)"
167 A.WriteLine "setParameter(_"MATERIAL",_"Armada_inf_I",_"TREPLA/
    YLDSTR",_" & Worksheets(ii + 1).Range("F46") & ")"
168 A.WriteLine "addGeometry(_"Area_Armada_inf_I",_"RELIN",_"REBAR"
    ,_[]_)"
169 A.WriteLine "setParameter(_"GEOMET",_"Area_Armada_inf_I",_"REIEMB
    /CROSSE",_" & Worksheets(ii + 1).Range("I44") & ")"
170 A.WriteLine "setReinforcementAspects(_"Cord_inf_I",_)"
171 A.WriteLine "assignMaterial(_"Armada_inf_S",_"SHAPE",_["Cord_inf
    I",_]_)"
172 A.WriteLine "assignGeometry(_"Area_Armada_inf_I",_"SHAPE",_["Cord_inf
    I",_]_)"
173 A.WriteLine "resetElementData(_"SHAPE",_["Cord_inf_I",_]_)"
174 A.WriteLine "setReinforcementDiscretization(_["Cord_inf_I",_]_"
    ELEMENT",_)"
175
176 'DEFINICIÓN DE LA INTERFAZ DE LA PLACA DE CARGA
177
178 A.WriteLine "addMaterial(_"Interfaz_Placa_de_Carga",_"INTERF",_"
    ELASTI",_[]_)"
179 A.WriteLine "setParameter(_"MATERIAL",_"Interfaz_Placa_de_Carga",
    _"LINEAR/IFTYP",_"LIN2D",_)"
180 A.WriteLine "setParameter(_"MATERIAL",_"Interfaz_Placa_de_Carga",
    _"LINEAR/ELAS2/DSNY",_1e+15_)"
181 A.WriteLine "setParameter(_"MATERIAL",_"Interfaz_Placa_de_Carga",
    _"LINEAR/ELAS2/DSSX",_1e+07_)"
182 A.WriteLine "addGeometry(_"Element_geometry_7",_"LINE",_"STRLIF"
    ,_[]_)"
183 A.WriteLine "rename(_"GEOMET",_"Element_geometry_7",_"AnchuraINT"
    ,_)"
184 A.WriteLine "setParameter(_"GEOMET",_"AnchuraINT",_"THICK",_" &
    Worksheets(ii + 1).Range("C18") & ")"
185 A.WriteLine "setParameter(_"GEOMET",_"AnchuraINT",_"LOCAXS",_
    True_)"
186 A.WriteLine "setInterfaceContactAspects(_"SHAPEEDGE",_"PLACA CARGA"
    ,_[_2.53,_0.552,_0_]_,_"Interfaz_Placa_de_Carga",_)"
187 A.WriteLine "setElementClassType(_"SHAPEEDGE",_"PLACA CARGA",_[[_
    2.53,_0.552,_0_]_,_"STRLIF",_)"
188 A.WriteLine "assignGeometry(_"AnchuraINT",_"SHAPEEDGE",_"PLACA
    CARGA",_[[_2.53,_0.552,_0_]_]_)"
189 A.WriteLine "resetElementData(_"SHAPEEDGE",_"PLACA CARGA",_[[_
    2.53,_0.552,_0_]_]_)"
190
191
192

```

```

193 'DEFINICIÓN DE LAS ARMADURAS DE CORTANTE
194
195 Dim condicion As String
196 Dim n As Long
197
198 condicion = (Worksheets(ii + 1).Range("D48"))
199 n = (Worksheets(ii + 1).Range("D49"))
200
201 If condicion = "SI" Then
202
203 A.WriteLine "addMaterial( " & "Acero_cortante" & ", " & "MCSTEL" & ", " & "TRESCA" & ",
    & "]" & ")"
204 A.WriteLine "setParameter( " & "MATERIAL" & ", " & "Acero_cortante" & ", " & "LINEAR
    & "/ELASTI/YOUNG" & ", " & 2e+11 & ")"
205 A.WriteLine "setParameter( " & "MATERIAL" & ", " & "Acero_cortante" & ", " & "LINEAR
    & "/ELASTI/POISON" & ", " & 0.3 & ")"
206 A.WriteLine "setParameter( " & "MATERIAL" & ", " & "Acero_cortante" & ", " & "TREPLA
    & "/YLDSTR" & ", " & Worksheets(ii + 1).Range("G56") & " )"
207
208 Dim geomnom As String
209 geomnom = Chr(34) & "Geom cortante" & Chr(34)
210 A.WriteLine "addGeometry( " & geomnom & ", " & "RELIN" & ", " & "REBAR" & ", " & "]" & ")"
211
212 A.WriteLine "setParameter( " & "GEOMET" & ", " & geomnom & ", " & "REIEMB/
    & "CROSSE" & ", " & Worksheets(ii + 1).Cells(55, 1) & " )"
212
213 For i = 1 To n
214 Dim nom As String
215 nom = Chr(34) & "C" & i & Chr(34)
216
217 A.WriteLine "createLine( " & nom & ", " & "[" & Worksheets(ii + 1).
    Cells(52, i) & ", " & Worksheets(ii + 1).Cells(38, 2) + (Worksheets
    (ii + 1).Cells(50, 4) / 2) & ", " & 0 & "], " & "[" & Worksheets(ii + 1)
    .Cells(52, i) & ", " & Worksheets(ii + 1).Cells(38, 8) (
    Worksheets(ii + 1).Cells(50, 4) / 2) & ", " & 0 & "]" & ")"
218
219 A.WriteLine "setReinforcementAspects( [" & nom & " ] )"
220 A.WriteLine "assignMaterial( " & "Acero_cortante" & ", " & "SHAPE" & ", " & "[" & nom
    & "]" & ")"
221 A.WriteLine "assignGeometry( " & geomnom & ", " & "SHAPE" & ", " & "[" & nom & " ]
    & ")"
222 A.WriteLine "resetElementData( " & "SHAPE" & ", " & "[" & nom & " ] & ")"
223 A.WriteLine "setReinforcementDiscretization( " & "[" & nom & " ], " & "ELEMENT
    & " & ")"
224
225 Next i
226 Else
227 End If
228
229
230

```

```

231 'ASIGNACIONES PARA LAS PLACAS DE APOYO Y CARGA > ANCHURA
232
233 A.WriteLine "addMaterial(_ "Acero_Placas" , _ "MCSTEL" , _ "ISOTRO" , _
    [] _ )"
234 A.WriteLine "setParameter(_ "MATERIAL" , _ "Acero_Placas" , _ "LINEAR/
    ELASTI/YOUNG" , _ 2.1e+11 _ )"
235 A.WriteLine "setParameter(_ "MATERIAL" , _ "Acero_Placas" , _ "LINEAR/
    ELASTI/POISON" , _ 0.3 _ )"
236 A.WriteLine "clearReinforcementAspects_([_ "PLACA CARGA" , _ "APOYO 1 "
    " , _ "APOYO 2 " _ ] _ )"
237 A.WriteLine "setElementClassType(_ [_ "PLACA CARGA" , _ "APOYO 1 " , _ "
    APOYO 2 " _ ] , _ "MEMBRA" _ )"
238 A.WriteLine "assignMaterial(_ "Acero_Placas" , _ "SHAPE" , _ [_ "PLACA
    CARGA" , _ "APOYO 1 " , _ "APOYO 2 " _ ] _ )"
239 A.WriteLine "resetGeometry(_ "SHAPE" , _ [_ "PLACA CARGA" , _ "APOYO 1 "
    , _ "APOYO 2 " _ ] _ )"
240 A.WriteLine "resetElementData(_ "SHAPE" , _ [_ "PLACA CARGA" , _ "APOYO
    1 " , _ "APOYO 2 " _ ] _ )"
241
242 A.WriteLine "addGeometry(_ "Element_geometry_9" , _ "SHEET" , _ "MEMBRA
    " , _ [] _ )"
243 A.WriteLine "rename(_ "GEOMET" , _ "Element_geometry_9" , _ "Ancho_de_
    placas" _ )"
244 A.WriteLine "setParameter(_ "GEOMET" , _ "Ancho_de_placas" , _ "THICK"
    , " & Worksheets(ii + 1).Range("C18") & )"
245 A.WriteLine "clearReinforcementAspects_([_ "PLACA CARGA" , _ "APOYO 1 "
    " , _ "APOYO 2 " _ ] _ )"
246 A.WriteLine "setElementClassType(_ [_ "PLACA CARGA" , _ "APOYO 1 " , _ "
    APOYO 2 " _ ] , _ "MEMBRA" _ )"
247 A.WriteLine "assignMaterial(_ "Acero_Placas" , _ "SHAPE" , _ [_ "PLACA
    CARGA" , _ "APOYO 1 " , _ "APOYO 2 " _ ] _ )"
248 A.WriteLine "assignGeometry(_ "Ancho_de_placas" , _ "SHAPE" , _ [_ "
    PLACA CARGA" , _ "APOYO 1 " , _ "APOYO 2 " _ ] _ )"
249 A.WriteLine "resetElementData(_ "SHAPE" , _ [_ "PLACA CARGA" , _ "APOYO
    1 " , _ "APOYO 2 " _ ] _ )"
250
251 'MATERIAL DE LA VIGA > DE FORMA PROVISIONAL
252
253 Dim tipomat As String
254
255 tipomat = Worksheets(ii + 1).Range("D62")
256
257 If tipomat = "JCSS" Then
258
259 A.WriteLine "addMaterial(_ "Material_VIGA" , _ "CONCDC" , _ "JCSSPR" , _
    [_ "JCSSRF" _ ] _ )"
260 A.WriteLine "setParameter(_ "MATERIAL" , _ "Material_VIGA" , _ "JCSSMC/
    JCSSG1/JCSSGR" , _ "USER" _ )"
261 A.WriteLine "setParameter(_ "MATERIAL" , _ "Material_VIGA" , _ "JCSSMC/
    JCSS15/BASCST" , " & Worksheets(ii + 1).Range("D66") & )"
262 A.WriteLine "setParameter(_ "MATERIAL" , _ "Material_VIGA" , _ "JCSSMC/

```



```

263 JCSS15/STDDEV" & Worksheets(ii + 1).Range("D67") & ") "
A.WriteLine "setParameter(_"MATERIAL",_"Material_VIGA",_"JCSSMC/
POISON", & Worksheets(ii + 1).Range("D68") & ") "
264 A.WriteLine "setParameter(_"MATERIAL",_"Material_VIGA",_"JCSSRF/
COVARI/NX", & Worksheets(ii + 1).Range("D69") & ") "
265 A.WriteLine "setParameter(_"MATERIAL",_"Material_VIGA",_"JCSSRF/
COVARI/DECMTH",_"FENTON"_) "
266 A.WriteLine "addGeometry(_"Element_geometry_8",_"SHEET",_"MEMBRA
",_[_]) "
267 A.WriteLine "rename(_"GEOMET",_"Element_geometry_8",_"Ancho_VIGA
_HORM"_) "
268 A.WriteLine "setParameter(_"GEOMET",_"Ancho_VIGA_HORM",_"THICK"
,& Worksheets(ii + 1).Range("C18") & ") "
269 A.WriteLine "clearReinforcementAspects(_"VIGA"_) "
270 A.WriteLine "setElementClassType(_"VIGA",_"MEMBRA"_) "
271 A.WriteLine "assignMaterial(_"Material_VIGA",_"SHAPE",_[_"VIGA"
_]_) "
272 A.WriteLine "assignGeometry(_"Ancho_VIGA_HORM",_"SHAPE",_[_"VIGA
"_]_) "
273 A.WriteLine "resetElementData(_"SHAPE",_[_"VIGA"_]_) "
274
275 ElseIf tipomat = "TSCM" Then
276
277 Dim MÓDULO DE YOUNG As String
278 Dim COEFICIENTE DE POISSON As Double
279 Dim DENSIDAD As Double
280 Dim CRACK BANDWIDTH As Double
281 Dim ENERGÍA DE FRACTURA DEL HORMIGÓN As Double
282 Dim RESISTENCIA A TRACCIÓN As Double
283 Dim RESISTENCIA MÁXIMA A COMPRESIÓN As Double
284 Dim ENERGÍA DE FRACTURA DEL HORMIGÓN A COMPRESIÓN As Double
285
286 MÓDULO DE YOUNG = Worksheets(ii + 1).Range("D73")
287 COEFICIENTE DE POISSON = Worksheets(ii + 1).Range("D74")
288 ENERGÍA DE FRACTURA DEL HORMIGÓN = Worksheets(ii + 1).Range("D75")
289 RESISTENCIA A TRACCIÓN = Worksheets(ii + 1).Range("D76")
290 RESISTENCIA MÁXIMA A COMPRESIÓN = Worksheets(ii + 1).Range("D77")
291
292 A.WriteLine "addMaterial(_"Hormigon_TSCM",_"CONCR",_"TSCR",_[_]_) "
293 A.WriteLine "setParameter(_"MATERIAL",_"Hormigon_TSCM",_"LINEAR/
ELASTI/YOUNG", & MÓDULO DE YOUNG & ") "
294 A.WriteLine "setParameter(_"MATERIAL",_"Hormigon_TSCM",_"LINEAR/
ELASTI/POISON", & COEFICIENTE DE POISSON & ") "
295 A.WriteLine "setParameter(_"MATERIAL",_"Hormigon_TSCM",_"MODTYP/
TOTCRK",_"ROTATE"_) "
296 A.WriteLine "setParameter(_"MATERIAL",_"Hormigon_TSCM",_"TENSIL/
TENCrv",_"LINEAR"_) "
297 A.WriteLine "setParameter(_"MATERIAL",_"Hormigon_TSCM",_"TENSIL/
GF1", & ENERGÍA DE FRACTURA DEL HORMIGÓN & ") "
298 A.WriteLine "setParameter(_"MATERIAL",_"Hormigon_TSCM",_"TENSIL/

```

```

TENSTR" ", " & RESISTENCIAATRACCIÓN & ") "
299 A.WriteLine "setParameter(_ "MATERIAL" , _ "Hormigon_TSCM" , _ "COMPRS/
    COMCRV" , _ "CONSTA" _ )"
300 A.WriteLine "setParameter(_ "MATERIAL" , _ "Hormigon_TSCM" , _ "COMPRS/
    COMSTR" ", " & RESISTENCIAMÁXIMAACOMPRESIÓN & ") "
301 A.WriteLine "setParameter(_ "MATERIAL" , _ "Hormigon_TSCM" , _ "COMPRS/
    CONFIN/CNFCRV" , _ "VECCHI" _ )"
302
303 Dim tipocurva As String
304 tipocurva = Worksheets(ii + 1).Range("D78")
305
306 If tipocurva = "PARABOLICA" Then
307
308 A.WriteLine "setParameter(_ "MATERIAL" , _ "Hormigon_TSCM" , _ "COMPRS/
    COMCRV" , _ "PARABO" _ )"
309 A.WriteLine "setParameter(_ "MATERIAL" , _ "Hormigon_TSCM" , _ "COMPRS/
    GC" ", " & Worksheets(ii + 1).Range("D79") & ") "
310
311 Else
312 End If
313
314 A.WriteLine "addGeometry(_ "Element_geometry_8" , _ "SHEET" , _ "MEMBRA
    " , _ []) "
315 A.WriteLine "rename(_ "GEOMET" , _ "Element_geometry_8" , _ "Ancho_VIGA
    _HORM" _ )"
316 A.WriteLine "setParameter(_ "GEOMET" , _ "Ancho_VIGA_HORM" , _ "THICK" "
    , " & Worksheets(ii + 1).Range("C18") & ") "
317 A.WriteLine "clearReinforcementAspects_([_ "VIGA" _]) "
318 A.WriteLine "setElementClassType(_ [_ "VIGA" _] , _ "MEMBRA" _ )"
319 A.WriteLine "assignMaterial(_ "Hormigon_TSCM" , _ "SHAPE" , _ [_ "VIGA"
    _] _ )"
320 A.WriteLine "assignGeometry(_ "Ancho_VIGA_HORM" , _ "SHAPE" , _ [_ "VIGA
    " _] _ )"
321 A.WriteLine "resetElementData(_ "SHAPE" , _ [_ "VIGA" _] _ )"
322
323 ElseIf tipomat = "MULTILINEAL" Then
324
325 Dim numeropuntos As String
326
327 MÓDULO DE YOUNG = Worksheets(ii + 1).Range("D83")
328 numeropuntos = Worksheets(ii + 1).Range("F93")
329 COEFICIENTE DE POISSON = Worksheets(ii + 1).Range("D84")
330 ENERGÍA DE FRACTURA DEL HORMIGÓN = Worksheets(ii + 1).Range("D85")
331 RESISTENCIA ATRACCIÓN = Worksheets(ii + 1).Range("D86")
332 RESISTENCIA MÁXIMA A COMPRESIÓN = Worksheets(ii + 1).Range("D87")
333
334 A.WriteLine "addMaterial(_ "Hormigon_MULTLN" , _ "CONCR" , _ "TSCR" , _
    [] _ )"
335 A.WriteLine "setParameter(_ "MATERIAL" , _ "Hormigon_MULTLN" , _ "
    LINEAR/ELASTI/YOUNG" ", " & MÓDULO DE YOUNG & ") "
336 A.WriteLine "setParameter(_ "MATERIAL" , _ "Hormigon_MULTLN" , _ "

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337 LINEAR/ELASTI/POISON"" & COEFICIENTEDEPOISSON & ") "
A.WriteLine "setParameter(_"MATERIAL"_,_"Hormigon_MULTLN"_,_"
MODTYP/TOTCRK"_,_"ROTATE"_) "
338 A.WriteLine "setParameter(_"MATERIAL"_,_"Hormigon_MULTLN"_,_"
TENSIL/EPSIGT"_,_[_]_) "
339 A.WriteLine "setParameter(_"MATERIAL"_,_"Hormigon_MULTLN"_,_"
TENSIL/TENCRV"_,_"MULTLN"_) "
340 A.WriteLine "setParameter(_"MATERIAL"_,_"Hormigon_MULTLN"_,_"
TENSIL/EPSIGT"_,_[ "
341
342 For j = 1 To numeropuntos
343 If j = numeropuntos Then
344 A.WriteLine Worksheets(ii + 1).Cells(93 + j, 1) & ",_" & Worksheets(
ii + 1).Cells(93 + j, 2) & "_]_) "
345 Else
346 A.WriteLine Worksheets(ii + 1).Cells(93 + j, 1) & ",_" & Worksheets(
ii + 1).Cells(93 + j, 2) & ",_"
347 End If
348
349 Next j
350
351 A.WriteLine "setParameter(_"MATERIAL"_,_"Hormigon_MULTLN"_,_"
COMPRS/COMCRV"_,_"PARABO"_) "
352 A.WriteLine "setParameter(_"MATERIAL"_,_"Hormigon_MULTLN"_,_"
COMPRS/COMSTR"_,_" & RESISTENCIAMÁXIMAACOMPRESIÓN & ") "
353 A.WriteLine "setParameter(_"MATERIAL"_,_"Hormigon_MULTLN"_,_"
COMPRS/GC"_,_" & Worksheets(ii + 1).Range("D89") & ") "
354 A.WriteLine "setParameter(_"MATERIAL"_,_"Hormigon_MULTLN"_,_"
COMPRS/CONFIN/CNFCRV"_,_"VECCHI"_) "
355
356 tipocurva = Worksheets(ii + 1).Range("D88")
357
358 If tipocurva = "PARABOLICA" Then
359
360 A.WriteLine "setParameter(_"MATERIAL"_,_"Hormigon_MULTLN"_,_"
COMPRS/COMCRV"_,_"PARABO"_) "
361 A.WriteLine "setParameter(_"MATERIAL"_,_"Hormigon_MULTLN"_,_"
COMPRS/GC"_,_" & Worksheets(ii + 1).Range("D89") & ") "
362
363 Else
364 End If
365
366 A.WriteLine "addGeometry(_"Element_geometry_8"_,_"SHEET"_,_"MEMBRA
"_,_[_]_) "
367 A.WriteLine "rename(_"GEOMET"_,_"Element_geometry_8"_,_"Ancho_VIGA
_HORM"_) "
368 A.WriteLine "setParameter(_"GEOMET"_,_"Ancho_VIGA_HORM"_,_"THICK"
_,_" & Worksheets(ii + 1).Range("C18") & ") "
369 A.WriteLine "clearReinforcementAspects_([_"VIGA"_]_) "
370 A.WriteLine "setElementClassType(_[_"VIGA"_]_,_"MEMBRA"_) "
371 A.WriteLine "assignMaterial(_"Hormigon_MULTLN"_,_"SHAPE"_,_[_"VIGA

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372  ""] ) "
A.WriteLine "assignGeometry( _ "Ancho_VIGA_HORM" , _ "SHAPE" , _ [ _ "VIGA
    "" ] ) "
373  A.WriteLine "resetElementData( _ "SHAPE" , _ [ _ "VIGA" _ ] ) "
374
375  Else
376  End If
377
378  'DISCRETIZACIÓN EN ELEMENTOS FINITOS
379
380  A.WriteLine "setElementSize( _ [ _ "VIGA" , _ "PLACA CARGA" , _ "APOYO 2 " "
    , _ "APOYO 1 " _ ] , " & Worksheets( ii + 1 ).Range("D61") & " ) "
381  A.WriteLine "setMesherType( _ [ _ "VIGA" , _ "PLACA CARGA" , _ "APOYO 2 " " ,
    _ "APOYO 1 " _ ] , _ "HEXQUAD" _ ) "
382  A.WriteLine "generateMesh_ ( [] ) "
383  A.WriteLine "hideView_ ( "GEOM" ) "
384  A.WriteLine "showView_ ( "MESH" ) "
385
386  'DEFINICIÓN DEL ANÁLISIS A REALIZAR
387
388  nombrealisis = Worksheets( ii + 1 ).Name
389  escalonescarga = Worksheets( ii + 1 ).Range("H61") & "(" & Worksheets(
    ii + 1 ).Range("H62") & " ) "
390
391  A.WriteLine "addAnalysis_( " & Chr(34) & nombrealisis & Chr(34) & " )
    "
392  A.WriteLine "addAnalysisCommand( " & Chr(34) & nombrealisis & Chr
    (34) & " , _ "NONLIN" , _ "Structural_nonlinear" _ ) "
393  A.WriteLine "setAnalysisCommandDetail( " & Chr(34) & nombrealisis &
    Chr(34) & " , _ "Structural_nonlinear" , _ "EXECUT(1)/LOAD/STEPS/
    EXPLIC/SIZES" , _ " & Chr(34) & escalonescarga & Chr(34) & " ) "
394  A.WriteLine "setAnalysisCommandDetail( " & Chr(34) & nombrealisis &
    Chr(34) & " , _ "Structural_nonlinear" , _ "EXECUT(1)/LOAD/STEPS/
    EXPLIC/SIZES" , _ " & Chr(34) & escalonescarga & Chr(34) & " ) "
395  A.WriteLine "addAnalysisCommandDetail( " & Chr(34) & nombrealisis &
    Chr(34) & " , _ "Structural_nonlinear" , _ "EXECUT(1)/LOAD/STEPS/
    EXPLIC/ARCLN" _ ) "
396  A.WriteLine "setAnalysisCommandDetail( " & Chr(34) & nombrealisis &
    Chr(34) & " , _ "Structural_nonlinear" , _ "EXECUT(1)/LOAD/STEPS/
    EXPLIC/ARCLN" , _ True _ ) "
397  A.WriteLine "setAnalysisCommandDetail( " & Chr(34) & nombrealisis &
    Chr(34) & " , _ "Structural_nonlinear" , _ "EXECUT(1)/ITERAT/MAXITE"
    , _ 50 _ ) "
398  A.WriteLine "setAnalysisCommandDetail( " & Chr(34) & nombrealisis &
    Chr(34) & " , _ "Structural_nonlinear" , _ "EXECUT(1)/ITERAT/MAXITE"
    , _ 50 _ ) "
399  A.WriteLine "setAnalysisCommandDetail( " & Chr(34) & nombrealisis &
    Chr(34) & " , _ "Structural_nonlinear" , _ "EXECUT(1)/ITERAT/CONVER/
    DISPLA/NOCONV" , _ "CONTIN" _ ) "
400  A.WriteLine "setAnalysisCommandDetail( " & Chr(34) & nombrealisis &
    Chr(34) & " , _ "Structural_nonlinear" , _ "EXECUT(1)/ITERAT/CONVER/

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FORCE/NOCONV"" ,_"CONTIN""_) "
401 A.WriteLine "setAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"OUTPUT(1)/SELTYP"" ,_"
USER""_) "
402 A.WriteLine "addAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"OUTPUT(1)/USER""_) "
403 A.WriteLine "addAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"OUTPUT(1)/USER/DISPLA""_) "
404 A.WriteLine "addAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"OUTPUT(1)/USER/STRESS""_) "
405 A.WriteLine "addAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"OUTPUT(1)/USER/STRAIN(1)/
CRACK""_) "
406 A.WriteLine "addAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"OUTPUT(1)/USER/STRAIN(2)/
CRKWDT""_) "
407 A.WriteLine "addAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"OUTPUT(1)/USER/PARAME(1)/
COMSTR""_) "
408 A.WriteLine "addAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"OUTPUT(1)/USER/PARAME(2)/
TENSTR""_) "
409 A.WriteLine "setAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"EXECUT(1)/LOAD/STEPS/
STEPTY"" ,_"AUTOMA""_) "
410 A.WriteLine "setAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"EXECUT(1)/LOAD/STEPS/
AUTOMA/SIZES"" ,_800_) "
411 A.WriteLine "setAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"EXECUT(1)/LOAD/STEPS/
AUTOMA/MAXSIZ"" ,_0.01_) "
412 A.WriteLine "setAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"EXECUT(1)/LOAD/STEPS/
AUTOMA/CUTBCK"" ,_0.5_) "
413 A.WriteLine "setAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"EXECUT(1)/LOAD/STEPS/
AUTOMA/MINSIZ"" ,_0.0001_) "
414 A.WriteLine "setAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"EXECUT(1)/LOAD/STEPS/
AUTOMA/CUTBCK"" ,_0.85_) "
415 A.WriteLine "addAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"EXECUT(1)/LOAD/STEPS/
AUTOMA/ARCLN""_) "
416 A.WriteLine "setAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"EXECUT(1)/LOAD/STEPS/
AUTOMA/ARCLN"" ,_True_) "
417 A.WriteLine "addAnalysisCommandDetail(" & Chr(34) & nombrealisis &
Chr(34) & ",_"Structural_nonlinear"" ,_"EXECUT(1)/LOAD/STEPS/
AUTOMA/ARCLN/AUTARC""_) "

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## CAPÍTULO D.

```
418 A.WriteLine "setAnalysisCommandDetail(" & Chr(34) & nombrealanalysis &  
    Chr(34) & ",_""Structural_nonlinear"" ,_"EXECUT(1)/LOAD/STEPS/  
    AUTOMA/ARCLLEN/AUTARC"" ,_True_)"  
419 A.WriteLine "setAnalysisCommandDetail(" & Chr(34) & nombrealanalysis &  
    Chr(34) & ",_""Structural_nonlinear"" ,_"EXECUT(1)/LOAD/STEPS/  
    AUTOMA/ARCLLEN/AUTARC"" ,_False_)"  
420 A.WriteLine "saveProjectAs_(" & Chr(34) & Worksheets(1).Range("D10")  
    & nombrealanalysis & ".dpf" & Chr(34) & ")"  
421 A.WriteLine "runSolver_(" & Chr(34) & nombrealanalysis & Chr(34) & ")"  
422 A.WriteLine "saveProjectAs_(" & Chr(34) & Worksheets(1).Range("D10")  
    & nombrealanalysis & ".dpf" & Chr(34) & ")"  
423  
424 Else  
425 End If  
426  
427 Next ii  
428  
429 A.Close  
430  
431 End Sub
```